Devoted to
TEXTILE
CHEMISTRY
BLEACHING
DYEING
PRINTING
FINISHING

JUNE 14, 1948
VOLUME 37, No. 12

AMERICAN DYESTUFF REPORTER

OFFICIAL PUBLICATION
of the
PROCEEDINGS
AMERICAN ASSOCIATION
OF TEXTILE CHEMISTS
AND COLORISTS

Fast and bright...
vat colors on wool

NOW ... vat colors can be applied to wool, producing the brightness *and* fastness so well known on cotton and rayon! Pastel shades too! Du Pont has developed new techniques for applying all types of vat colors to wool raw stock and to tops. Vats already are achieving importance for automobile upholstery, drapery fabrics, and for hand knitting yarns. They give you qualities never before obtainable.

In Du Pont's line of colors are Ponsol*—anthraquinone-type dyes—and Sulfanthrene*—thioindigoid and related dyes. For more information on Du Pont's latest development in vat dyes and application methods, contact our Technical Staff. Trained dyestuffs experts at Du Pont are always ready to help you on your problems. E. I. du Pont de Nemours & Co. (Inc.), Dyestuffs Div., Wilmington 98, Del.

*REG. U. S. PAT. OFF.

Du Pont Dyestuffs
DU PONT
REG. U.S. PAT. OFF.
BETTER THINGS FOR BETTER LIVING ... *THROUGH CHEMISTRY*

APPRATEX 84

Reg. U. S. Pat. Off.

ANIONIC SUBSTANTIVE SOFTENER FOR CELLULOSIC FABRICS

Appratex 84, a result of Warwick research, is a new, substantive softener of exceptional stability. It will not oxidize on the fabric to cause discoloration or rancidity. Appratex 84 will not discolor white goods, develop undesirable odors after ageing or hot pressing, and has no adverse effect on the light-fastness of dyeings.

This substantive softener may be exhausted onto cellulosic fabrics from a dilute solution. The finish thus obtained shows a considerable degree of resistance to laundering. Appratex 84 is compatible with other anionic finishes and alkaline material—especially important when combining with antifume agents and many other types of material.

A WARWICK technical advisor is always available to help work out special problems in connection with individual needs.

WARWICK CHEMICAL COMPANY, Division of SUN CHEMICAL CORP., 10-10 44th Ave., Long Island City, N. Y.

AMANTHRENE* VAT COLORS
provide the answer to the demand for
better color fastness in textiles

Amanthrene

PINK FF

in paste and
double powder form

A vat pink of distinction.
Its delicate brilliant shade tone is that
of fastidious ARISTOCRACY.

Without a peer for the printing of fine cotton
and rayon dress goods and draperies as a self color or
in combination. Equally suitable for dyeing the
same fibres. Offering the particular advantages of
both smooth paste and fine powder.

Another of the Amanthrene range of superior vat colors.
For detailed information on the whole range available, as well as
data regarding your own particular requirements,
consult our nearest branch. A.A.P. technicians are always
happy to be of service.

AMERICAN ANILINE PRODUCTS, INC., 50 Union Square, New York, N. Y. • ***Plant:*** Lock Haven, Pa.
Branches: Boston, Mass. • Providence, R. I. • Philadelphia, Pa. • Charlotte, N. C. • Chicago, Ill. • Los Angeles, Cal.
Chattanooga, Tenn. • **Dominion Anilines & Chemicals Ltd.** • Toronto, Canada • Montreal, Canada

*Reg. U. S. Pat. Off.

B. F. PERKINS & SON, Inc.

HOLYOKE, MASS., U.S.A.

LARGEST MANUFACTURERS OF CALENDER ROLLS IN THE WORLD

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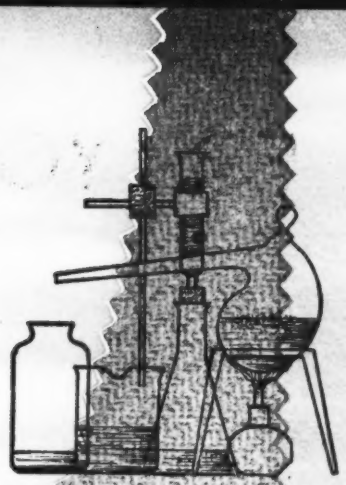

a **NEW** development applicable to all fabrics

REPCOLENE K-50

REPCOLENE K-50 has a wide field of application as a penetrating—scouring—wetting—leveling, dispersing and finishing agent

STABLE IN HARD WATER—COMPATIBLE WITH SOAP

REPCOLENE K-50 has great softening action on animal and vegetable fibres.

REPCOLENE K-50 is economical as it greatly reduces the amount of finishing compound required in scouring and dyeing operations.

WRITE FOR COMPLETE INFORMATION SHEET

REFINED PRODUCTS CORPORATION

Lyndhurst • New Jersey

Manufacturers of PERMA-CIDE, the approved, outstanding, mildew-proofing agent

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CLARENCE E. MOSS, 19 Wilson Ave., Rumford (16), R. I.
CARBIC COLOR & CHEMICAL CO., INC., 68 Pine St., Providence, R. I.

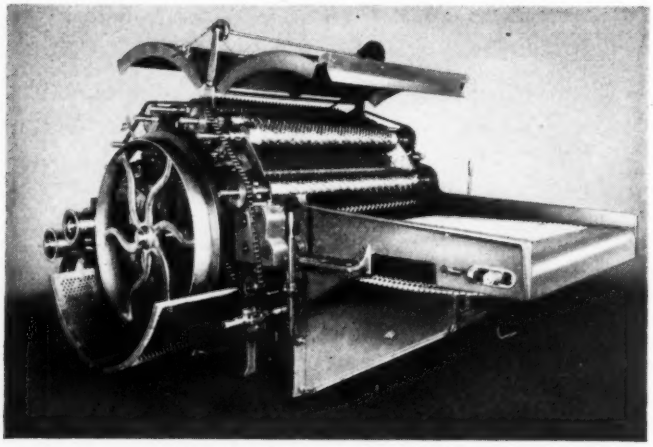
California Representative: SIDNEY SPRINGER, 1521 So. Grand Ave., Los Angeles, California

Canadian Selling Agents: Carbic Color and Chemical Co., Inc., 56 McNab Street South, Hamilton, Ontario

Exporting Agent: Chem-Cel Company, 82 Wall St., New York City

FOR YOUR INFORMATION

NOW...Woolens as well as worsteds get added YARN strength with SYTON*



Syton is added to oil and applied, here at the picker, usually in a spray or dip.

Increases in yarn tensile strength from ten up to 30% . . . for woolens as well as worsteds . . . are being obtained by mills using Monsanto's submicroscopic dispersion, Syton. Applied in oil at the picker, the evenly-distributed silica particles strengthen woolen yarn by increasing "fiber drag," reducing the tendency of individual fibers to slide by each other. The stronger, Syton-treated woolens include these five operating advantages:

1 **INCREASED PRODUCTION:** Since Syton strengthens woolens by reducing fiber slippage, the amount of twist necessary to maintain a given tensile strength can be reduced. This reduction in twist means a corresponding increase in the rate of spinning . . . the rate of production.

2 **LOFTIER YARNS:** A second advantage of reducing twist is that loft of woolen yarn is improved . . . with tensile strength equal to or greater than that of untreated yarns of normal twist. This loft and softness . . . with yarn strength maintained . . . is a major advantage in knitting yarns. In a previous stage, the loftier roping resulting from Syton allows an easier draft in the spinning operation.

3 **FEWER ENDS DOWN:** Reductions in ends down vary from 25% to 50% depending on the grade of wool . . . an outstanding operating benefit. Mills report that Syton also reduces lap waste and the amount of fly during spinning and cuts down static charge in the fiber.

4 **IMPROVED SPINNING QUALITIES:** As a result of twist reduction, Syton-treated fibers have less tendency to move forward and form slubs during spinning. The quality and appearance of the yarn is improved and more uniform; fewer slubs, thin spots and tied ends.

5 **FINER YARNS POSSIBLE:** Syton-treated yarns may be spun closer to the limit spin, depending upon the particular grade of wool.

Woolen mills now can gain early competitive advantages by looking into Syton . . . now . . . for improved fabrics and greater production efficiency. The handy coupon, checked at F1, will bring you full information.

STYMER* FOR ACETATE CUTS STATIC PROBLEMS

Static electricity . . . and the problems it creates in acetate weaving . . . are greatly reduced when Monsanto's new synthetic sizing agent, Stymer, is used to slash the warps. The static electricity reduction is only one of the reasons Stymer is proving successful in current mill weaving operations.

Stymer is easily applied in a uniform coating on the individual yarn. It adheres well to the fiber and is also easy to scour from the woven fabric in warm water containing alkali and a detergent. The Stymer sized warp, in addition to reducing static, is strong, abrasion resistant, and smooth.

You are invited to try Stymer in your own acetate sizing operations. F3 on the coupon will bring you full information.

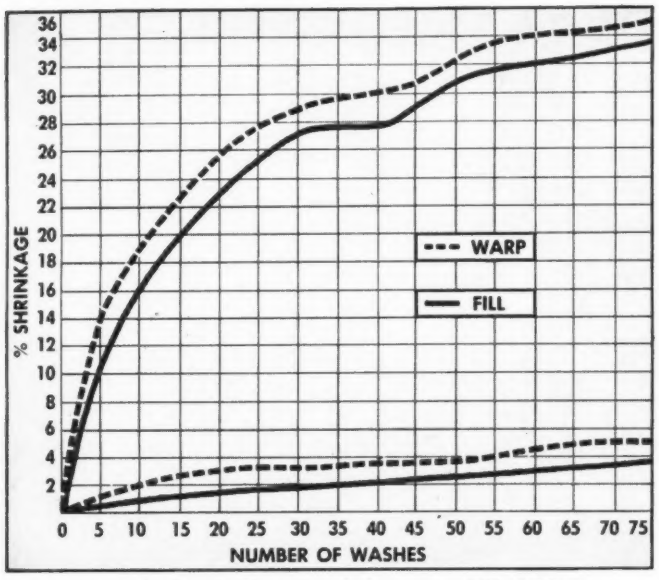
BETTER, MORE DURABLE COTTON FINISHES ACHIEVED WITH MERLON*

Durable cotton sheeting finishes with a soft, fine, appearance are now provided by Monsanto's Merlon BR, a stable dispersion of plasticized polyvinyl butyral in water. The fine hand . . . necessary for merchandising . . . remains on the goods after several washings. To achieve the desired finish the Merlon is used in concentrations of about one to 3% solids.

Formulations of Merlon with thickeners, fillers and pigments may be prepared to alter viscosity, improve body, change film characteristics, add color and reduce cost.

Both Merlon BR and Merlon BRS, a companion product with added plasticizer, are recommended for all types of finishing operations and for combining, bonding and strengthening textile fibers and fabrics. Because of their advantages over fugitive type finishes, they are particularly recommended for rug and pile fabric backings, adhesives and coatings. The coupon, checked at F2, will bring you full information.

75 WASHES PROVE RESLOOM* DURABLE IN WASHABLE WOOL



Untreated, all-wool 9½ oz. flannel shows up to 34% shrinkage in 75 washes while Resloom-treated flannel shrinks less than 5% in 75 washes . . . which would cover the normal life of the fabric.

New and conclusive tests prove that Resloom W, Monsanto's melamine resin for washable wool, is a lasting, durable treatment which does not wash out of the fiber even after 75 washes. Mill-run, Resloomed-flannel shrank as little as 3% during 35 washes in laboratory automatic washing machine . . . and only a total of 5% after 75 commercial practice washes. The same 9 oz. flannel shrank 28% to 30% in 40 washes and 34% in 75 washes.

Main significance to manufacturers and retailers lies in this fact, now well established: Resloom W keeps wool washable for the lifetime of the garment under practical wearing and washing conditions. The 75 washes are far more than the average consumer uses on woolens such as sports shirts, blankets, children's garments or suiting.

While the tests indicated on the chart were made in the laboratory, further proof of Resloom's efficiency for washable wool is available in actual field tests. For several months last winter a large number of Resloom-treated shirts were tested . . . worn and washed under usual consumer conditions. There was no noticeable shrinkage in any of the shirts. Further tests by Monsanto show that maximum shrinkage was less than 2%.

One manufacturer of Resloom-treated woolens is tagging his shirts: "Wash or dry clean," and has been selling them successfully for more than a year. Not one shirt has been returned for shrinkage!

Now is the time to give your woolens this plus value . . . make them washable with Resloom W . . . Monsanto's effective, durable, field-tested process for shrinkage control. For more information check F4. *Reg. U. S. Pat. Off.

SUDSLESS STED ACHIEVES BETTER TEXTILE CLEANING

Contrary to deep-rooted belief . . . even in some textile mills . . . foam is not necessarily a mark of good detergency.

For example, current Monsanto tests show that the cleaning efficiency of Monsanto's low-cost textile detergent STED surpasses the detergency of most lather-producing compounds. The action of Sted reduces the adherence of soil to the fabric surface and holds it in suspension so that mechanical action and subsequent rinsing will remove the soil without redeposition.

Sted is scientifically built, non-ionic detergent to be used specifically in textile washing where it succeeds at the toughest jobs. It is particularly useful in operations where foam and scum are objectionable . . . and in hard water. Sted's non-ionic nature, high potency, non-substantivity and low pH values make it particularly effective in wool scouring. With Sted, very little grease is retained and the wool is loftier, more open and brighter. None of the detergent is deposited on the wool as with substantive detergents.

The powerful new detergent is also recommended for backwashing, desizing, kier boiling, continuous bleaching, silk degumming, hosiery scouring and for the soaping off printed and dyed goods.

Although Sted's detergent action is powerful, the product is so mild that it will not damage the most delicate fiber . . . regardless of the nature of the soil. The moderate pH values of this Monsanto product provide buffered alkalinity . . . protecting the fiber from the action of strong alkalis. Sted is non-oxidizing and can cause no tendering or reduction in fabric strength as it does not form acid or alkaline products in a fabric upon storage. Your inquiries are invited through F5 on the coupon.

MONSANTO CHEMICALS FOR PLASTICS

MONSANTO CHEMICAL COMPANY, Desk No. ADT 6, Textile Chemicals Dept.
140 Federal Street, Boston 10, Mass.

Please send me information on the subjects checked below:

.....F1 .....F2 .....F3 .....F4 .....F5.

Name _____ Title _____

Company _____

Address _____

City _____ State _____

SERVING INDUSTRY . . . WHICH SERVES MANKIND

When the eyes vote "Aye"...

Skilled textile people know that the eye says "yes" to any sale faster when a fabric is properly processed.

That explains why so many of America's leading mills, converters, finishers and dyers have turned to Colgate-Palmolive-Peet for high-quality wetting, fulling, scouring and dispersing agents.

Remember, there is a C.P.P. soap or synthetic detergent for every type of fabric—for every processing problem. Ask your local Colgate-Palmolive-Peet representative for details. Or, write today to Industrial Department, Colgate-Palmolive-Peet Company.

(Winter housecoat made up from bright Buchanan plaid, predominantly red and yellow with tones of green and blue. 100% spun rayon, tightly woven in 54" width.)

COLGATE FORMULA 25

For low-temperature washing ordinarily requiring olive oil soaps. Sold in eastern states only.

COLGATE WHITE SOAP FLAKES

High-grade thin white flakes. Not milled or polished. 90% anhydrous soap.

ARCTIC CRYSTAL FLAKES

Made from pure tallow, guaranteed to contain 88% or more soap. Titer approx. 42°C.

ARCTIC SYNTEX A, T, AND M

Superior synthetic detergents and wetting agents for many textile processing operations.

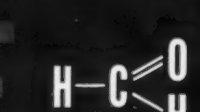
COLGATE FORMULA 10

92% oleic acid soda soap in flake form for silk degumming, wool scouring, all textile processing.

Colgate-Palmolive-Peet Company

Jersey City 2, N. J. • Atlanta 3, Ga. • Chicago 11, Ill. • Kansas City 3, Kans. • Berkeley 2, Calif.

HEYDEN FORMALDEHYDE



PUTS THE PLUS IN YOUR PROCESS!*

Ever since its discovery in 1867, formaldehyde has been doing strange and vitally important things in the industrial and scientific world. A chemical "jack-of-all trades", formaldehyde's uses range from fumigation to fabrics, photography to protective coatings, biology to bombs, disinfectants to dyes.

Heyden Formaldehyde is extensively used today in the formulation of phenol formaldehyde resins for the plastics industry—for molding and casting compounds, and for adhesives.

The chemical and process industries use Heyden formaldehyde for manufacture of polyhydric alcohols—for increasing the wet strength of paper—for making better paints, lacquers and kindred products—for production of urea and melamine formaldehyde resins, for glazing chintz, for crease resistance of fabrics, and for wool stabilization against shrinkage.

Formaldehyde Heyden is a clear, colorless liquid, low in acid, ash and metal content. Produced under rigid laboratory control to assure uniform yields and high quality, it is available as Formaldehyde Solution U. S. P., with formaldehyde content not less than 37% by weight. Also obtainable in methanol-free grade.

Shipped in tank cars, drums, barrels, kegs, carboys and bottles—or tank trucks in the New York metropolitan area only.

FORMALDEHYDE • PARAFORMALDEHYDE
HEXAMETHYLENETETRAMINE

Technical Bulletins on the use and handling of Formaldehyde and its derivatives are mailed promptly on request.

*THE PLUS IN YOUR PROCESS

. . . Constant source of supply.
. . . Production control through uniformity.
. . . Exacting specifications — assured quality.
. . . Extensive facilities of 5 modern plants.

Serving Industry Through Finer Chemicals

HEYDEN CHEMICAL CORPORATION

393 SEVENTH AVENUE, NEW YORK 1, N. Y.
CHICAGO OFFICE 20 North Wacker Drive
PHILADELPHIA OFFICE, 1700 Walnut Street

FINE HEYDEN CHEMICALS

Benzaldehyde • Benzoates • Benzoic Acid • Benzyl Chloride • Bromides • Chlorinated Aromatics • Medicinal Creosotes • Formates Formaldehyde • Formic Acid • Glycerophosphates • Medicinal Guaiacols • Hexamethylenetetramine-M.D.A. • Paraformaldehyde Parahydroxybenzoates • Penicillin • Pentaerythritols • Salicylates

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Calgon*

in the dyebath

— reduces "crocking"

— aids penetration

— increases solubility

— eliminates scum

For full information on these and other advantages of Calgon in the textile industry, write for bulletin "Calgon Data for the Textile Chemist."

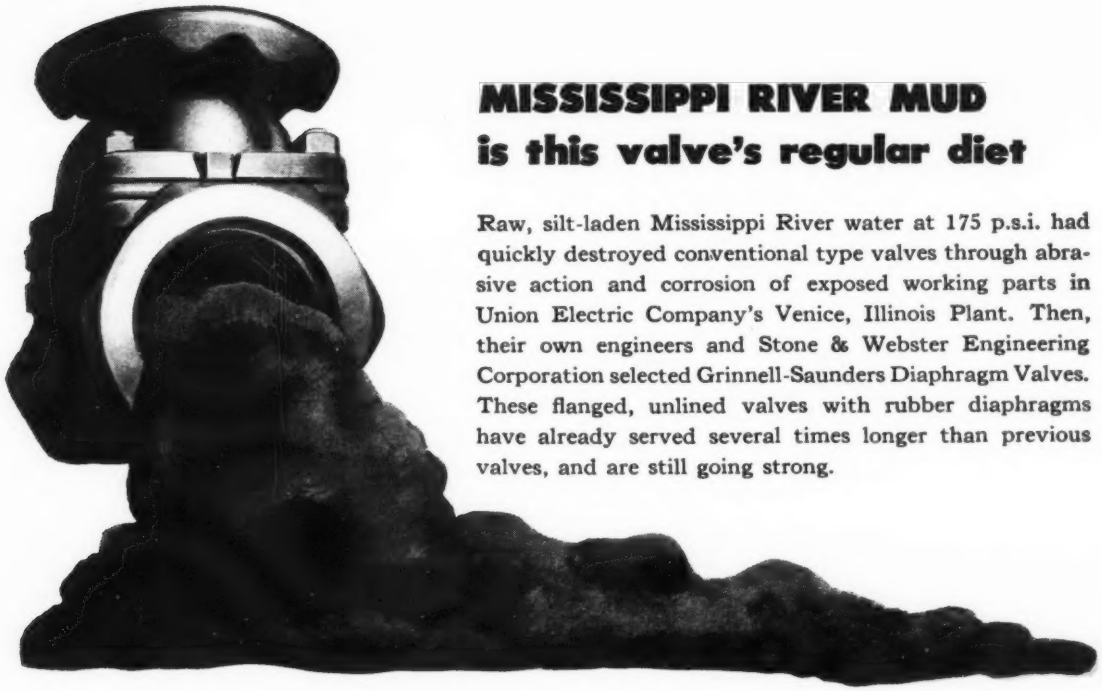
*T. M. Reg. U. S. Pat. Off.

HAGAN HALL BUROMIN CALGON

calgon, inc.

A SUBSIDIARY OF HAGAN CORPORATION

HAGAN BUILDING PITTSBURGH 30, PA.



MISSISSIPPI RIVER MUD is this valve's regular diet

Raw, silt-laden Mississippi River water at 175 p.s.i. had quickly destroyed conventional type valves through abrasive action and corrosion of exposed working parts in Union Electric Company's Venice, Illinois Plant. Then, their own engineers and Stone & Webster Engineering Corporation selected Grinnell-Saunders Diaphragm Valves. These flanged, unlined valves with rubber diaphragms have already served several times longer than previous valves, and are still going strong.

YOU, too, may find your answer to valve troubles due to corrosion, contamination or suspended solids, in

GRINNELL-SAUNDERS DIAPHRAGM VALVES

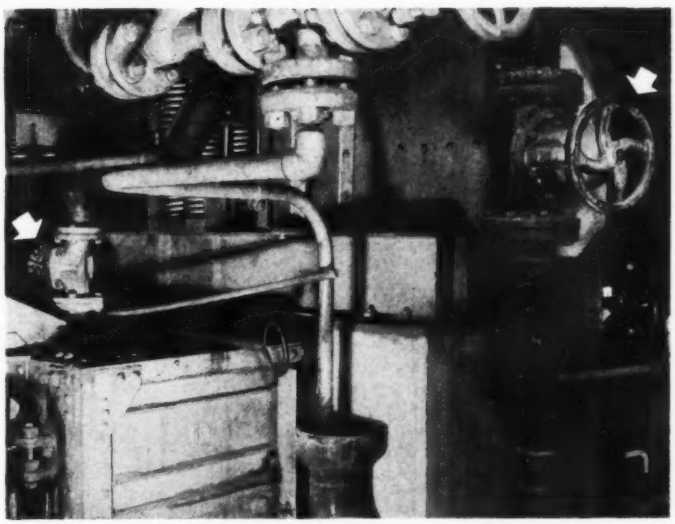
ISOLATED WORKING PARTS — The flexible diaphragm isolates working parts of the valve from the fluid, preventing contamination or corrosion.

CORROSION-PROOF LININGS — A selection of diaphragm materials and also body linings of glass, porcelain, lead, rubber or synthetics to suit your service requirements.

STREAMLINED FLOW . . . POSITIVE CLOSURE — Streamlined passage without pockets minimizes friction. Large area of contact of the diaphragm, plus diaphragm resilience, permit positive closure even when solids are trapped.

Write for catalog—Grinnell-Saunders Diaphragm Valves.

GRINNELL COMPANY, INC.
Providence 1, R. I.



Grinnell-Saunders Valves on ash sluicing lines in central power station.

BRANCH WAREHOUSES

Atlanta 2, Ga.	Kansas City 16, Mo.	Philadelphia 34, Pa.
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GRINNELL
WHENEVER PIPING IS INVOLVED

It's What Hooker Sulfides Haven't Got that Make Them Important to You

COMPARATIVE freedom from heavy metal salts, the negligible amount of iron,—a maximum limit of 5 ppm in Hooker Sodium Sulfhydrate, and a maximum limit of 8 ppm in Hooker Sodium Sulfide—are reasons why these Hooker Chemicals are so popular among dye chemists.

This high purity, consistently maintained in every shipment, makes them especially desirable for use as reducing agents. These sulfides are employed with excellent results for selective reduction of one of several nitro groups in the same molecule. To eliminate the possible harmful effects of iron, Hooker Sulfides are extensively used in the preparation of aminophenol, many of the anthraquinone dyes, including acid, and nitro compounds such as acid Alizarin Blue SE, Developed Dyes, Rapidogen Dyes and Intermediates.

Another way that Hooker Sulfides are used is for the introduction of sulfur in dye manufacture. They also serve as solvents in the removal of excess sulfur from dyes produced by a sulfur fusion.

Because of their high purity, the need for settling, decanting and filtering is minimized and in many cases eliminated altogether, saving time and inconvenience.

Let Hooker Sulfides improve your products, save valuable time and lower your costs.

SODIUM SULFIDE, Na_2S, a light yellow colored solid in flake form, soluble in water, slightly soluble in alcohol, insoluble in ether.

Analysis

Sodium Sulfide	60 to 62%
Sodium Chloride	1.5% Max.
Sodium Salts	2.0% Max.
Iron	8 ppm Max.
All Other Metal Salts	1 ppm Max.
Water of crystallization	36.5 to 34.5%
Shipping Containers	Drums 90 and 350 lbs. net.

SODIUM SULFHYDRATE, NaSH, a light yellow colored solid in flake form. Soluble in water and alcohol, insoluble in ether.

Analysis

Sodium Sulfhydrate	70 to 72%
Sodium Hydroxide	0%
Sodium Sulfide	0.25 to 2.5%
Sodium Chloride	0.4 to 0.8%
Other Sodium Salts	0.04 to 0.4%
Iron	5 ppm Max.
All Other Metals	1 ppm Max.
Water of Crystallization	28 to 26%
Shipping Containers	Drums 90 and 350 lbs. net.

Hooker's Technical Staff is ready to work with you on the application of Hooker Chemicals to your processes. Technical Data Sheets and samples of Hooker Sulfides will be sent you when requested on your letterhead.

HOOKER CHEMICALS

8386

HOOKER ELECTROCHEMICAL COMPANY

2 Forty-seventh St. New York, N. Y. — Niagara Falls, New York — Tacoma, Wash. — Wilmington, Calif.

Chlorine
Caustic Soda
Muriatic Acid
Paradichlorbenzene

SAVE SOAP—SAVE MONEY

WITH

YARMOR

HERCULES PINE OIL

In wet processing of cotton, wool, silk, or rayon, Hercules Yarmor* enhances the detergent action of soap . . . penetrates deeper . . . wets out thoroughly . . . and rinses clean.

This pure, steam-distilled pine oil is an excellent solvent for waxes and oils . . . an excellent dispersant for dyes.

It will pay you to investigate Yarmor Pine Oils. For technical details, request the services of an experienced Hercules service man, or ask your supplier of textile chemicals. Mail coupon for the book, "Hercules Pine Oils in the Textile Industry."

WETS AND PENETRATES

REMOVES DIRT AND GREASE

RINSES CLEAN

HERCULES

*REG. U. S. PAT. OFF.

HERCULES POWDER COMPANY
INCORPORATED
993 Market Street, Wilmington 99, Delaware

Send free book, "Hercules Pine Oils in the Textile Industry."

Name_____

Title_____

Company_____

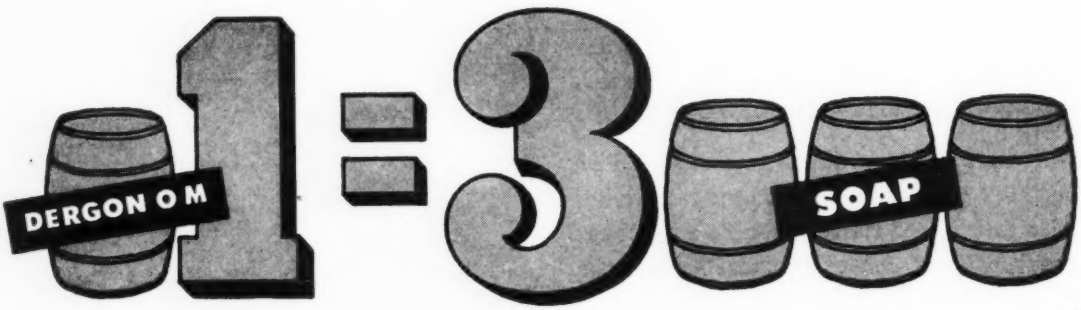
Street_____

City_____ Zone_____ State_____

TO OVERCOME RISING COSTS:
REPLACE SOAP WITH
DERGON O M

(Reg. U. S. Pat. Off.)

for scouring all types of fabrics, woolens, cottons, rayons, and all knitted fabrics, including hosiery



DERGON O M IS A HIGHLY EFFICIENT DETERGENT AND A POWERFUL OIL EMULSIFIER

WRITE FOR INFORMATION OR DEMONSTRATION

ARKANSAS CO., INC.

NEWARK, NEW JERSEY

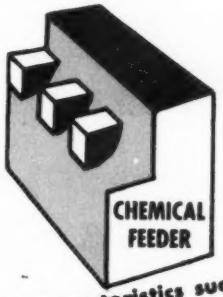
MANUFACTURERS OF INDUSTRIAL CHEMICALS FOR OVER 40 YEARS

SIMPLICITY OF HANDLING...
SAFETY IN APPLICATION...
STABILITY IN STORAGE...

...That's BECCO HYDROGEN PEROXIDE

By far the most important use of hydrogen peroxide is its application as a bleaching agent. Commercial hydrogen peroxide solutions simply diluted with water to a suitable concentration, bleach almost any organic material.

FOR MOST ECONOMICAL USE special groundwood bleaching methods have been developed by BECCO. The amounts of hydrogen peroxide needed for bleaching are small, but the results obtained are outstanding. Some of these are:



1 **Substantially no loss in weight.**

2 **Retention of groundwood's desirable characteristics such as bulk, absorbency, strengths, and formation on the machine.**

3 **High brightness increases.**

Now is the time to investigate the use of Becco Hydrogen Peroxide for groundwood pulp bleaching. Write to:

BECCO

BECCO SALES CORPORATION

AGENTS FOR BUFFALO ELECTRO-CHEMICAL CO., INC.

18 Sawyer Avenue, Buffalo 7, N. Y.

New York · Boston · Philadelphia · Chicago · Charlotte

ORATOL L-48

The problem in dyeing is to secure maximum penetration, quickly . . . level results with the most delicate shades . . . with no waste time or added expense.

Oratol L-48 is a powerful detergent . . . with high foaming, emulsifying, and wetting properties . . . and quick-as-a-flash scouring action. As a dye-bath assistant, Oratol L-48 is stable in hard water and performs equally well on all types of fibres — under acid or alkaline conditions.

What this means to you:

1. Quick, thorough penetration
2. Greater assurance of level dyeing
3. Fewer redyes . . . fewer rejects
4. Greater output . . . greater profit

Oratol L-48 has other important advantages: It is not affected by metallic salts. It acts as a dispersing agent for lime soap deposits. It rinses rapidly, requires less water, improves fabric hand.

Ask our representative about economical Oratol L-48. Or write, today, for technical data and your generous free sample for testing.

A Feature to Remember!

ORATOL L-48 MAKES A GOOD BASE FOR DYEING

Plants, Branches and Warehouses

Plants: Passaic, Carlstadt, N. J.; Los Angeles, Calif.

Warehouses: Providence, R. I.; Philadelphia, Pa.; Utica, N. Y.; Chicago, Ill.; Greenville, S. C.; Chattanooga, Knoxville, Tenn.

WOLF BRAND PRODUCTS

JACQUES WOLF & CO.

Chemicals PASSAIC, N. J.

When you can't afford a mistake

A narrow channel—a strong current—sharp rocks in your path—that's a combination that calls for skill and judgment. You just can't afford a mistake.

Skill and judgment—and the selection of the best working tools—also play a very important part in successful finishing operations. Bleachers and dyers know the problems that can arise with every batch of cloth—and they know *one way* to avoid them is to use the all-purpose de-sizing agent, Diastafor brand—Type L.

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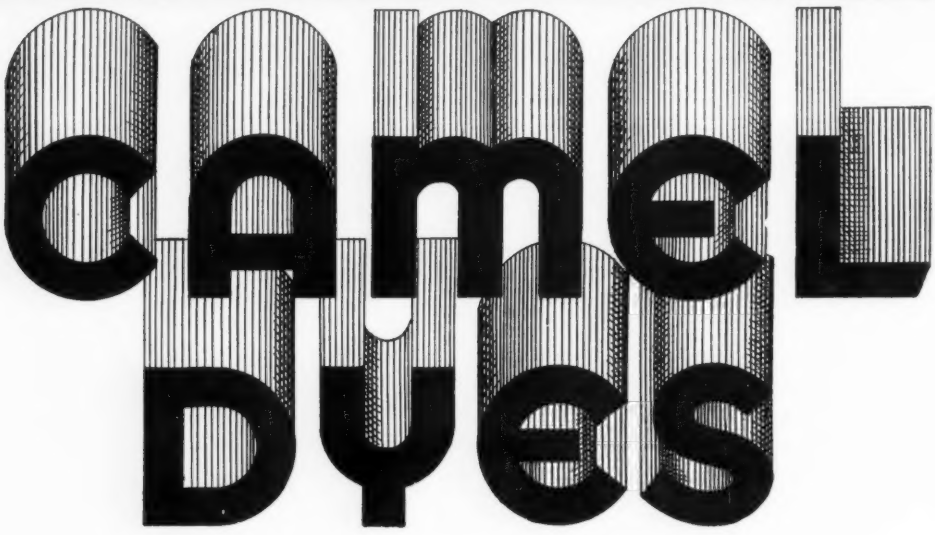

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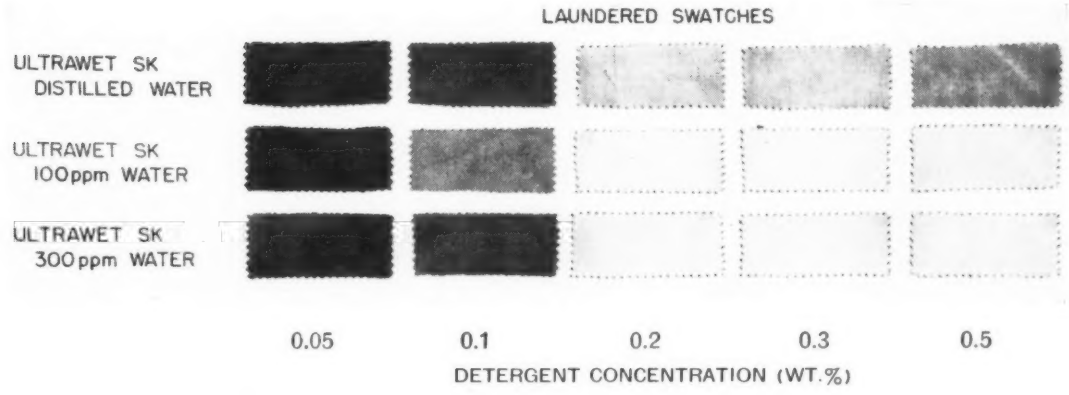

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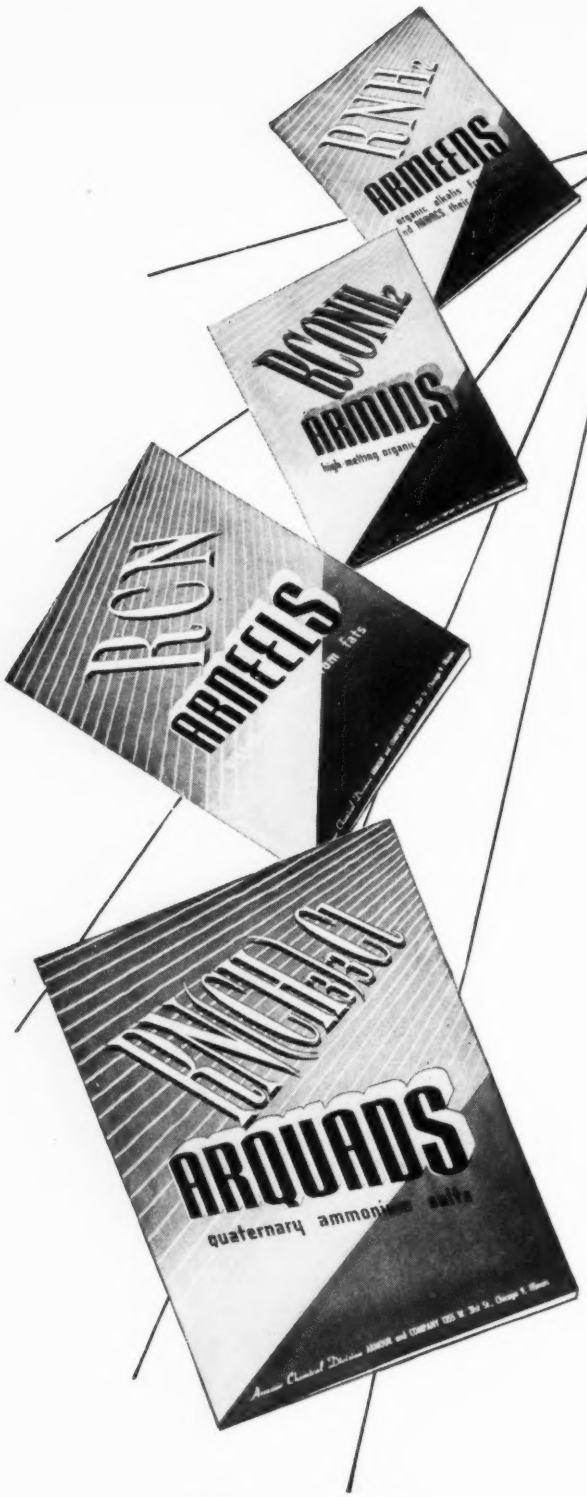

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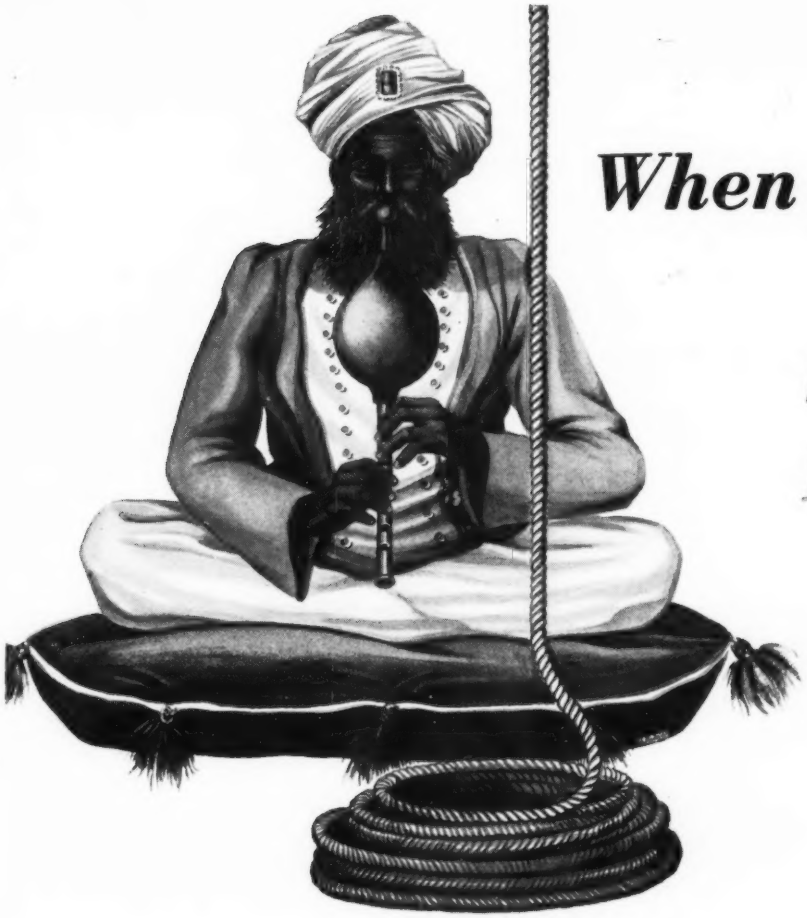

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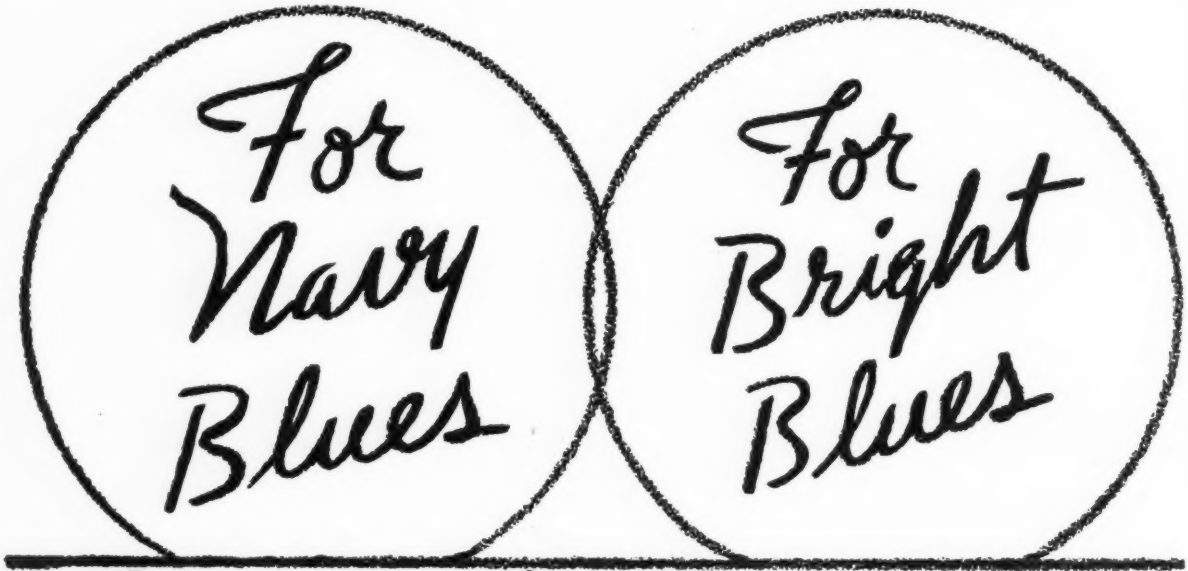

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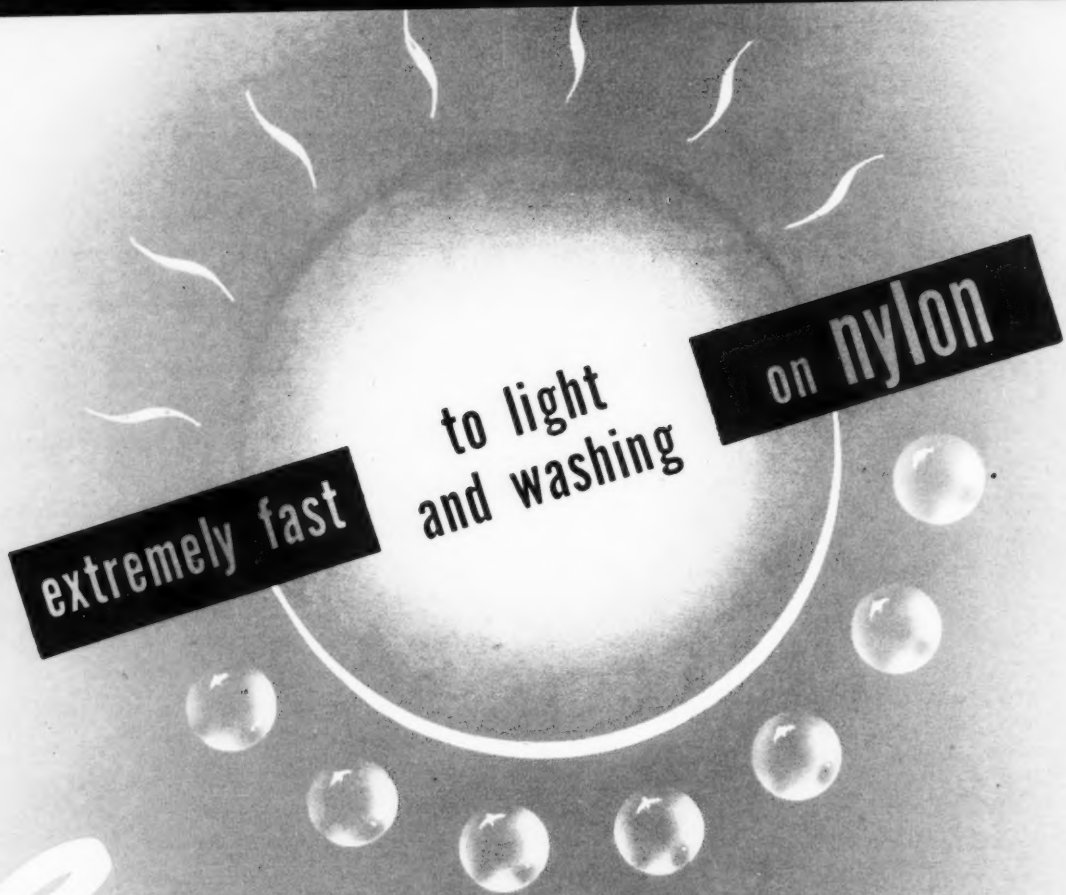

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A Comparison of the Effect on Rayon Fabrics of Various Gases Under Controlled Conditions

FRANCES KARR RAY*, PAULINE BEERY MACK
Ellen H. Richards Institute,
The Pennsylvania State College
and
FREDERIC BONNET, ARTHUR H. WACHTER
American Viscose Corporation

Introduction

THE gas or mixture of gases to be used in a gas fading test is an important factor about which the investigation herein reported was designed to contribute information.

In 1935, Goodall *(1)* showed that blue acetate rayon fabrics were susceptible to a fading reaction in the dark, reproducible by burnt gas fumes and caused, he believed, by the presence in the gases of nitrogen oxides. Some dyes were found to be sensitive to acids, which could be demonstrated by exposure to sulfur dioxide. While fading resulting from the latter could be restored to the original color by ammonia, that resulting from exposure to oxides of nitrogen was found to be permanent.

In 1936 Jones *(2)* reported on the effect of sulfur dioxide, and also on that of a combination of sulfur dioxide with oxides of nitrogen. When viscose rayons were exposed by this investigator to a total of 0.12 cubic feet of sulfur dioxide combined with 39.4 cubic feet of air over a period of from six to seven weeks, no changes were observed in color or strength, although fluidity measurements showed some increases. Viscose rayon yarns exposed to moist air and sulfur dioxide in the same proportions, with the addition of a total of 0.06 cubic feet of oxides of nitrogen, on the other hand, showed fading in some cases, with high losses in strength and high increases in fluidity.

Rowe and Chamberlain *(5)* reported in 1937 that, although the effect of sulfur dioxide on sensitive acetate dyes was negligible in comparison with the results with oxides of nitrogen, the sulfur dioxide and trioxide present in burnt gas fumes appeared to exert some influence on the ease of attack and on the ultimate decomposition products. The presence of the oxides of sulfur was found to vary considerably with the source of the gas supply, whereas the amount of oxides of nitrogen was independent of the composition of the gas burned. No means was found by these investigators, however, for obtaining a homogenous mixture of air with small controlled amounts of oxides of sulfur and of nitrogen.

In 1940 Siebert *(6)* reported that pure atmospheres of sulfur dioxide, whether moist or dry (apparently at ordinary room temperatures) had no effect on sensitive acetate dyes.

In a previous report by Ray *(3)*, the development of controllable gas fading equipment has been described. It was the purpose of the investigation covered herein to use this apparatus in a study of the comparative effects of small controlled quantities of oxides of nitrogen and sulfur dioxide, alone and in combination, on the color and strength of representative rayon fabrics.

Experimental Procedure

Type of Gas

With the total quantity of gas maintained at 100 cc. per hour under room conditions (approximately 85 cc. per hour at standard temperature and pressure), exposures were made with the following gases:

1. Oxides of nitrogen at a flow of 100 cc. per hour for two hours at four combinations of temperature and humidity, namely—at 55 ± 2.5° C. and 15 ± 3 per cent relative humidity; at 55 ± 2.5° C. and 50 ± 5 per cent relative humidity; at 65 ± 3.5° C. and 15 ± 3 per cent relative humidity; and at 65 ± 3.5° C. and 50 ± 5 per cent relative humidity.
2. Sulfur dioxide at a rate of flow of 100 cc. per hour under the same conditions as those specified under (1).
3. Oxides of nitrogen at a rate of flow of 50 cc. per hour mixed with sulfur dioxide like-wise at 50 cc. per hour, or a combined rate of flow of 100 cc. per hour, under the same conditions as those specified under (1).
4. Oxides of nitrogen at a rate of flow of 50 cc. an hour at 55 ± 2.5° C. and 15 ± 3 per cent relative humidity for comparison with the combined gases administered at a rate of flow of 50 cc. each, under the same temperature and humidity conditions.

Test Fabrics

Six test fabrics representing various degrees of sensitivity to gas fumes were used in this study.

These fabrics are described as follows:

Fabric Number 1. (Control 1)—Cellulose acetate satin fabric dyed with 1.0 per cent Celanthrene Brilliant Blue FFS.

Fabric Number 2. (Control 2)—Cellulose acetate satin dyed with 0.1 per cent Eastone Blue BB.

* Deceased March 1, 1947.

Fabric Number 3. (Control 3)—Cellulose acetate satin dyed with 0.8 per cent Setacyl Direct Blue G.D.

Fabric Number 4—Blue crepe of viscose and cellulose acetate rayon, dyed with a direct dye.

Fabric Number 5—Green crepe of viscose and cellulose acetate rayon, dyed with a direct dye.

Fabric Number 6—Blue gabardine of spun viscose dyed with a direct dye.

Fabric Number 7—Blue-green crepe of viscose and cellulose acetate rayon dyed with direct dyes.

To permit comparison of exposures to the various gases with actual exposure during wear, Fabric Number 7 was introduced because a garment made of this fabric had been in use under observation in the Pittsburgh area for three years.

Strips of Control Number 1 were used in ribbon form (secured from the American Association of Textile Chemists and Colorists) in addition to the cloth carrying the same dye. This was used as an additional check on each test.

Apparatus

Descriptions and complete illustrations of the gas fading chamber, the air-conditioning apparatus, and the equipment for feeding the gases has been given in a previous report by Ray *(3)*.

Adaptation of Gas-Feeding Equipment

The gas-feeding equipment for oxides of nitrogen was adapted for various rates of flow by changing the length of the 0.37 mm-bore capillary tube which was used. Capillary lengths of 114 mm. and 56 mm. were used for rates of approximately 50 cc. and 100 cc. per hour under room conditions, respectively.

The corresponding capillary lengths used in the gas-feeding equipment for sulfur dioxide were 282 mm. and 192 mm, respectively, giving rates of 50 cc. and 100 cc. per hour under room conditions.

Conditions Recorded

The conditions recorded periodically throughout all the tests were as follows:

(1) dry and wet bulb temperatures (bases for humidity determinations)
(2) temperature of gas (assumed to be the same as the medium surrounding the gas container)
(3) atmospheric pressure;
(4) pressure of gas (difference from atmospheric measured by means of manometer).
(5) length of test.

Because the rate of air flow was kept constant at 11 cubic feet per hour, it was not recorded in this study.

The amount of liquid used during each run was determined by measuring the amount required to refill the bottle employed for maintaining a constant level. This quantity was recorded for each test.

In the tests using oxides of nitrogen, the amount of dry gas employed (measured at standard conditions) was estimated by applying corrections for absorption, temperature of gas, pressure of gas, and pressure of water vapor to the total amount of water used during a test to displace the gas. When sulfur dioxide was used, the amount of gas used (measured at standard conditions) was estimated by applying similar corrections to the amount of mercury used to displace the gas.

The following formulae were used:
For oxides of nitrogen,

$$V_2 = V_1 \times 0.96 \times \frac{273}{T} \times \frac{P\text{-}P_v}{29.92}, \text{ and}$$

For sulfur dioxide,

$$V_2 = V_1 \times 0.96 \times \frac{273}{T} \times \frac{P}{29.92},$$

Where V_1 = volume of gas under conditions used.
V_2 = volume of gas measured at standard conditions.
T = temperature of gas (degrees Kelvin).
P = pressure of gas (inches of mercury).
P_v = pressure of water vapor at given temperature.

The correction factor applied to the volume of sulfur dioxide was based on a test made to determine whether an excessive amount of sulfur dioxide was absorbed during a two-hour test period by the mercury combined with the small amounts of merusol clinging to the bottle. A 100 cc. portion of mercury was entered into a 250 cc. bottle of sulfur dioxide through a funnel and stopcock. After a period of two hours at a constant temperature (26° C.), the addition of 4 cc. of mercury was required to bring the pressure of the gas up to atmospheric pressure. This indicated that the absorption of gas during a test period was approximately four per cent.

The rate of gas flow (cc. per hour) was determined by dividing the total quantity of gas used (cc. at standard conditions) by the length of the test.

Comparison of Test Exposures With Wear Exposure

As a basis for selecting the type of gas which most nearly simulated wear, strips of Blue-Green Crepe (Fabric 7) which had been exposed to each set of conditions were compared with faded areas of a garment exposed in Pittsburgh (previously described). Because of the small size of the specimens available, comparisons were made on the basis of visual color evaluations only.

Preparation and Exposure of Test Specimens

With the exception of the Blue-Green Crepe, the test specimens were cut, hemmed, pressed and arranged in the oven according to the procedure outlines in a previous report by Ray, Mack, Bonnet, and Wachter *(4)*. Because of the limited quantity of the Blue-Green Crepe, it was cut into strips varying from one-half to one inch wide and two to three inches long. The control strip was cut three-fourths of an inch wide and three inches long. Both the Blue-Green Crepe and the control strip were hemmed at one end for insertion of the glass rod and were given the same treatment as the regular test specimens.

Procedure for Equipment Operation

The procedure for operation of the equipment to attain the conditions used in this study has been described in the reference by Ray and collaborators *(4)*.

Determination of Color Changes

All specimens were evaluated for color changes both by visual inspection and by reflectometer readings used in calculation of units of color difference.

The methods of procedure for evaluation of color changes have been described in the above-cited reference by Ray et al *(4)*.

The visual examination results for color change were reported as: Class I *good* (no visible change); Class II *fair* (slight change); Class III *poor* (considerable change); Class IV *very poor* (extreme change).

Determination of Strength Changes

Five wet bursting strength measurements were made on each duplicate specimen, or a total of 10 on each fabric for each two-hour exposure. An unexposed specimen was tested at the same time. The Mullen motor-driven tester was employed for this purpose.

Presentation of Data

Table I gives a record of the conditions which pertained during the exposures to the various gases as outlined. Table II includes the fading and strength results for the various tests. This table is in four parts, each one representing one of the four temperature and humidity combinations which was investigated. Table III shows the comparison of fading results obtained with the different gases at a temperature of 55 ± 2.5° C, relative humidity 15 ± 3 per cent, and rate of flow 100 cc. per hour (total) using Fabric

TABLE I

Record of Conditions During Exposure of Fabrics to Various Compositions of Gases

Test Code	Composition of Gas Used	Average Oven Temperature °C	Average Oven Humidity		Length of Test in Hours	Atmospheric Pressure (Inches of Mercury)	Pressure of Gas (Inches of Mercury)	Total Volume of Liquid Used to Displace Gas (cc.)	Total Volume of Gas at Standard Conditions (cc.)	Rate of Flow of Gas at Room Conditions (cc. per Hour)	Rate in cc. Gas** (Standard Conditions) cc. per Hour
			Absolute*	Relative							
C-1	Oxides of Nitrogen	55 ±2.5	0.053	50 ±5	2	30.08	30.11	200	172	100	86
C-2	Oxides of Nitrogen	55 ±2.5	0.051	50 ±5	2	29.66	29.69	200	169	100	85
D-1	Oxides of Nitrogen	55 ±2.5	0.016	15 ±3	2	30.05	30.08	200	172	100	86
D-2	Oxides of Nitrogen	55 ±2.5	0.014	15 ±3	2	29.88	29.91	198	169	100	85
E-1	Oxides of Nitrogen	65 ±3.5	0.082	50 ±5	2	29.65	29.68	196	166	100	83
E-2	Oxides of Nitrogen	65 ±3.5	0.080	50 ±5	2	29.57	29.60	196	166	100	83
F-1	Oxides of Nitrogen	65 ±3.5	0.027	15 ±3	2	30.07	30.10	200	171	100	86
F-2	Oxides of Nitrogen	65 ±3.5	0.025	15 ±3	2	30.01	30.04	196	168	100	84
G	Sulfur dioxide	55 ±2.5	0.053	50 ±5	2	29.74	29.75	200	173	100	87
H	Sulfur dioxide	55 ±2.5	0.016	15 ±3	2	29.95	29.96	207	181	100	91
I	Sulfur dioxide	65 ±3.5	0.097	50 ±5	2	29.88	29.89	197	172	100	86
J	Sulfur dioxide	65 ±3.5	0.023	15 ±3	2	29.78	29.79	204	177	100	89
K-1	Oxides of Nitrogen and Sulfur dioxide	55 ±2.5	0.054	50 ±5	2	29.97	30.01 29.98	105 96	90 84	100***	45 42
K-2	Oxides of Nitrogen and Sulfur dioxide	55 ±2.5	0.054	50 ±5	2	29.92	29.96 29.93	110 93	94 81	100	47 41
L-1	Oxides of Nitrogen and Sulfur dioxide	55 ±2.5	0.013	15 ±3	2	29.96	30.00 29.97	100 86	86 75	100	43 38
L-2	Oxides of Nitrogen and Sulfur dioxide	55 ±2.5	0.013	15 ±3	2	29.67	29.71 29.68	98 98	83 86	100	44 43
M-1	Oxides of Nitrogen and Sulfur dioxide	65 ±3.5	0.092	50 ±5	2	29.55	29.59 29.56	105 100	88 87	100	44 44
M-2	Oxides of Nitrogen and Sulfur dioxide	65 ±3.5	0.092	50 ±5	2	29.43	29.47 29.44	104 90	87 78	100	44 39
N-1	Oxides of Nitrogen and Sulfur dioxide	65 ±3.5	0.026	15 ±3	2	29.36	29.40 29.37	105 100	88 86	100	44 43
N-2	Oxides of Nitrogen and Sulfur dioxide	65 ±3.5	0.026	15 ±3	2	29.50	29.54 29.51	100 100	84 87	100	42 44
O-1	Oxides of Nitrogen	55 ±2.5	0.012	15 ±3	2	29.87	29.87	110	94	50	47
O-2	(at one-half the rate of flow)	55 ±2.5	0.012	15 ±3	2	29.74	29.74	96	81	50	42

* Pounds of water vapor per pound of dry air.
** Entered into an air stream flowing at the rate of 275.8 liters per hour (corrected to standard conditions).
*** The rate of the combination of gas was 100 cc. per hour; oxides of nitrogen was admitted at the rate of 50 cc. and sulfur dioxide 50 cc. per hour.

TABLE II (Part I)

Relationship of Type of Gas to Fading and Strength Changes

(Time of Test: 2 hours. Oven Temperature: 55 ±2.5°C. Oven Relative Humidity: 15 ±3%)

TEST D. Oxides of Nitrogen (at 100 cc. per hour rate of flow).

Test Fabric	Visual Rating (Class)	Units of Color Differences (Average of Two Tests)	Description of Change	WET BURSTING STRENGTH	
				Original Strength (Pounds)	Strength After Exposure (Pounds)
Fabric Number 1 (Control 1)	IV	69.8 ±0.5	lighter, pinkish	38.2	37.7
Fabric Number 2 (Control 2)	IV	17.1 ±0.6	lighter, pinkish blue	39.1	39.1
Fabric Number 3 (Control 3)	II	5.6 ±0.2	lighter, duller	38.7	38.5
Fabric Number 4 (Blue Crepe)	IV	15.9 ±0.5	darker, duller, pinkish	37.1	37.1
Fabric Number 5 (Green Crepe)	IV	10.7 ±0.8	lighter, yellowish	35.6	35.3
Fabric Number 6 (Blue Gabardine)	I	0.8 ±0.3	No visible change	57.9	58.6
TEST H. Sulfur Dioxide (at 100 cc. per hour rate of gas flow.)					
Fabric Number 1 (Control 1)	I	(one test only) 2.2	No visible change	38.2	39.5
Fabric Number 2 (Control 2)	I	0.5	No visible change	39.1	38.9
Fabric Number 3 (Control 3)	I	1.4	No visible change	38.7	38.5
Fabric Number 4 (Blue Crepe)	I	1.4	No visible change	37.1	36.9
Fabric Number 5 (Green Crepe)	I	1.3	No visible change	35.6	34.3
Fabric Number 6 (Blue Gabardine)	I	1.1	No visible change	57.9	59.5
TEST L. Mixture of Oxides of Nitrogen and Sulfur Dioxide (each at 50 cc. per hour, or a total gas flow of 100 cc. per hour).					
Fabric Number 1 (Control 1)	IV	(Av. of two tests) 19.8 ±0.7	duller, pinkish, much less change than in Test D	38.2	39.5
Fabric Number 2 (Control 2)	II	3.8 ±0.2	Slightly duller, lighter	39.1	38.7
Fabric Number 3 (Control 3)	I	1.4 ±0.0	No change	38.7	38.9
Fabric Number 4 (Blue Crepe)	III	4.3 ±0.0	darker, duller	37.1	37.0
Fabric Number 5 (Green Crepe)	III	3.1 ±0.2	lighter, yellowish	36.6	35.1
Fabric Number 6 (Blue Gabardine)	I	0.8 ±0.3	No visible change	57.9	61.3
TEST O. Oxides of Nitrogen (at 50 cc. per hour rate of flow).					
Fabric Number 1 (Control 1)	IV	(Av. of two tests) 37.4 ±1.3	Pinkish	38.2	39.5
Fabric Number 2 (Control 2)	III	9.3 ±0.0	duller, lighter, pinkish	39.1	38.7
Fabric Number 3 (Control 3)	I	2.0 ±0.1	No visible change	38.7	38.9
Fabric Number 4 (Blue Crepe)	IV	6.0 ±0.5	darker, duller, pinkish	37.1	37.0
Fabric Number 5 (Green Crepe)	III	3.7 ±0.0	slightly lighter, more yellowish than in Test L	35.6	35.1
Fabric Number 6 (Blue Gabardine)	I	0.6 ±0.5	No visible change	57.9	61.3

TABLE II (Part II)

Relationship of Type of Gas to Fading and Strength Changes

(Time of Test: 2 hours. Oven Temperature: 55±2.5°C. Oven Relative Humidity: 50±5%)

Test Fabric	Visual Rating (Class)	Units of Color Differences (Average of Two Tests)	Description of Change	WET BURSTING STRENGTH: Original Strength (Pounds)	WET BURSTING STRENGTH: Strength After Exposure (Pounds)
TEST C. Oxides of Nitrogen (at 100 cc. per hour rate of flow).					
Fabric Number 1 (Control 1)	IV	68.2±0.0	lighter, pink	38.2	37.6
Fabric Number 2 (Control 2)	IV	16.2±1.5	lighter, pinkish blue	39.1	39.2
Fabric Number 3 (Control 3)	II	4.7±0.2	lighter, duller	38.7	38.9
Fabric Number 4 (Blue Crepe)	IV	12.2±0.0	darker, dullish, pinkish	37.1	37.6
Fabric Number 5 (Green Crepe)	IV	7.2±0.3	lighter, yellowish	35.6	35.3
Fabric Number 6 (Blue Gabardine)	I	0.8±0.3	No visible change	57.9	60.3
TEST G. Sulfur Dioxide (at 100 cc. per hour rate of flow).					
		(Only one test)			
Fabric Number 1 (Control 1)	I	1.0	No visible change	38.2	38.9
Fabric Number 2 (Control 2)	I	0.0	No visible change	39.1	38.5
Fabric Number 3 (Control 3)	I	0.5	No visible change	38.7	39.3
Fabric Number 4 (Blue Crepe)	I	0.0	No visible change	37.1	37.2
Fabric Number 5 (Green Crepe)	I	0.9	No visible change	35.6	34.7
Fabric Number 6 (Blue Gabardine)	I	0.0	No visible change	57.9	57.7
TEST K. Mixture of Oxides of Nitrogen and Sulfur Dioxide (each at 50 cc. per hour, or a total gas flow of 100 cc. per hour).					
		(Av. of Two Tests)			
Fabric Number 1 (Control 1)	IV	17.3±3.2	duller, pinkish	38.2	38.5
Fabric Number 2 (Control 2)	II	2.4±0.7	slightly duller and lighter	39.1	39.2
Fabric Number 3 (Control 3)	I	1.1±0.0	No visible change	38.7	38.0
Fabric Number 4 (Blue Crepe)	III	3.8±0.5	darker, duller	37.1	37.4
Fabric Number 5 (Green Crepe)	III	2.7±0.6	lighter, yellowish	35.6	35.0
Fabric Number 6 (Blue Gabardine)	I	0.8±0.2	No visible change	57.9	60.1

TABLE II—Continued (Part III)

Relationship of Type of Gas to Fading and Strength Changes

(Time of Test: 2 hours. Oven Temperature: 65±3.5°C. Oven Relative Humidity 15±3%)

Test Fabric	Visual Rating (Class)	Units of Color Differences (Average of Two Tests)	Description of Change	WET BURSTING STRENGTH: Original Strength (Pounds)	WET BURSTING STRENGTH: Strength After Exposure (Pounds)
TEST F. Oxides of Nitrogen (at 100 cc. per hour rate of flow).					
Fabric Number 1 (Control 1)	IV	69.3±0.0	lighter, slightly yellowish	38.2	38.3
Fabric Number 2 (Control 2)	IV	20.2±0.2	lighter, slightly pinkish	39.1	38.3
Fabric Number 3 (Control 3)	III	6.7±0.5	lighter, much duller	38.7	38.9
Fabric Number 4 (Blue Crepe)	IV	17.8±1.3	very pinkish	37.1	37.5
Fabric Number 5 (Green Crepe)	IV	11.1±0.4	much lighter, quite yellowish	35.6	35.1
Fabric Number 6 (Blue Gabardine)	I	1.1±0.0	No visible change	57.9	58.9
TEST J. Sulfur dioxide (at 100 cc. per hour rate of flow).					
		(Only one test)			
Fabric Number 1 (Control 1)	II	5.0	Pinkish	38.2	38.4
Fabric Number 2 (Control Number 2)	I	1.4	No visible change	39.1	38.1
Fabric Number 3 (Control 3)	I	1.0	No visible change	38.7	38.2
Fabric Number 4 (Blue Crepe)	I	1.1	No visible change	37.1	37.1
Fabric Number 5 (Green Crepe)	I	1.3	No visible change	35.6	35.5
Fabric Number 6 (Blue Gabardine)	I	0.0	No visible change	57.9	59.0
TEST N. Mixture of Oxides of Nitrogen and Sulfur Dioxide (each at 50 cc. per hour, or a total gas flow of 100 cc. per hour).					
		(Av. of Two Tests)			
Fabric Number 1 (Control 1)	IV	28.8±1.8	duller, quite pinkish	38.2	38.7
Fabric Number 2 (Control 2)	II	4.9±0.9	duller, considerably lighter	39.1	38.5
Fabric Number 3 (Control 3)	I	1.6±0.1	No visible change	38.7	38.5
Fabric Number 4 (Blue Crepe)	III	4.3±0.0	darker, duller	37.1	36.7
Fabric Number 5 (Green Crepe)	III	3.3±0.4	lighter, yellowish	35.6	35.6
Fabric Number 6 (Blue Gabardine)	I	0.5±0.0	No visible change	57.9	58.6

Number 7 which had been exposed not only in the laboratory but also during use in an industrial community. The data in Table II, Part I, have been shown graphically for fading as measured by units of color difference in Figure 1.

Discussion of Findings

Table I shows that the following groups of tests were made at comparable conditions, except for the type of gas employed: Tests D, H, and L; Tests C. G, and K; Tests F. J. and N; and Tests E, I, and M. Test O was similar to Tests D, H, and L except for the fact that the gas used (oxides of nitrogen) was run at a gas flow of 50 cc. per hour in order to compare this with Test L in which oxides of nitrogen at 50 cc. per hour and sulfur dioxide at 50 cc. per hour were used simultaneously. The results of the tests, shown in the four parts of Table II, may be discussed as follows:

Color Changes

It may be seen from all parts of Table II, that, regardless of the temperature and humidity used, oxides of nitrogen gave the greatest color change, whether estimated visually or measured by means of the reflectometer. This was true of all fabrics except those which were little amenable to gas fading change (Fabrics 3 and 6), in which cases the changes were only slight regardless of the gases used. Even in Fabric 3, however, the least sensitive of the controls, oxides of nitrogen alone gave the greatest change. In Fabric 6, the least sensitive of the consumer fabrics, changes were negligible with all gases.

Sulfur dioxide alone, at the same gas pressure as for the oxides of nitrogen just discussed, gave negligible changes throughout, regardless of the temperature and humidity conditions. A combination of oxides of nitrogen and sulfur dioxide, at 50 cc. per hour gas flow each, gave fading results throughout which were less severe than 100 cc. per hour of the oxides of nitrogen alone, and more so than the sulfur dioxide alone. In order to find whether the smaller amount of fading with the mixture of the two was the result of the lesser gas flow of the more effective gas (oxides of nitrogen), or whether the sulfur dioxide actually had a deterrent effect upon the fading, oxides of nitrogen at a rate of flow of 50 cc. an hour was used alone with one series (temperature 55 ± 2.5 and relative humidity 15 ± 3%). Under these conditions, fading was more severe with the oxides of nitrogen at 50 cc. per hour than with the oxides of nitrogen at 50 cc. mixed with sulfur dioxide likewise at 50 cc. per hour, making a total rate of flow of 100 cc. per

TABLE II—Continued (Part IV)

Relationship of Type of Gas to Fading and Strength Changes

(Time of Test: 2 hours. Oven Temperature: 65 ±3.5°C. Oven Relative Humidity: 50 ±5%)

Test Fabric	Visual Rating (Class)	Units of Color Differences (Average of Two Tests)	Description of Change	WET BURSTING STRENGTH: Original Strength (Pounds)	WET BURSTING STRENGTH: Strength After Exposure (Pounds)
TEST E. Oxides of Nitrogen (at 100 cc. per hour rate of flow).					
Fabric Number 1 (Control 1)	IV	71.1 ±0.3	light, yellowish pink	38.2	37.8
Fabric Number 2 (Control 2)	IV	17.0 ±0.7	lighter, pinkish blue	39.1	39.1
Fabric Number 3 (Control 3)	III	4.7 ±0.3	darker, duller, quite pinkish	38.7	38.5
Fabric Number 4 (Blue Crepe)	IV	12.4 ±0.9	darker, duller, pinkish	37.1	37.0
Fabric Number 5 (Green Crepe)	IV	6.3 ±0.2	lighter, yellowish	35.6	35.4
Fabric Number 6 (Blue Gabardine)	I	0.8 ±0.3	No visible change	57.9	59.6
TEST I. Sulfur Dioxide (at 100 cc. per hour rate of flow). (Only One Test)					
Fabric Number 1 (Control 1)	I	1.0	No visible change	38.2	38.3
Fabric Number 2 (Control 2)	I	0.5	No visible change	39.1	39.0
Fabric Number 3 (Control 3)	I	0.5	No visible change	38.7	38.3
Fabric Number 4 (Blue Crepe)	I	1.1	No visible change	37.1	37.6
Fabric Number 5 (Green Crepe)	I	0.0	No visible change	35.6	35.6
Fabric Number 6 (Blue Gabardine)	I	1.0	No visible change	57.9	61.3
TEST M. Mixture of Oxides of Nitrogen and Sulfur Dioxide (each at 50 cc. per hour, or a total gas flow of 100 cc. per hour). (Av. of Two Tests)					
Fabric Number 1 (Control 1)	IV	17.5 ±1.5	duller, pinkish	38.2	39.3
Fabric Number 2 (Control 2)	II	2.6 ±0.0	slightly duller and lighter	39.1	38.8
Fabric Number 3 (Control 3)	I	1.0 ±0.4	No visible change	38.7	38.8
Fabric Number 4 (Blue Crepe)	III	3.8 ±0.5	darker, duller	37.1	37.0
Fabric Number 5 (Green Crepe)	III	2.7 ±0.6	lighter, yellowish	35.6	35.0
Fabric Number 6 (Blue Gabardine)	I	0.5 ±0.0	No visible change	57.9	59.8

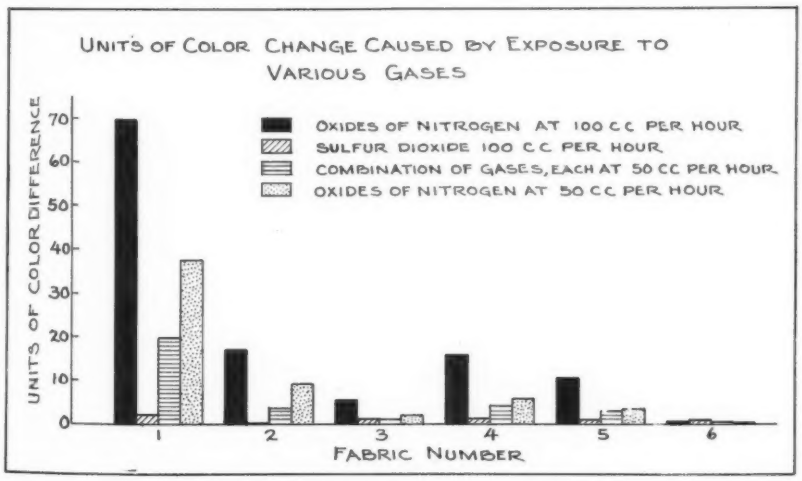

Figure 1

Response of Six Test Fabrics to Specified Exposures with Gases Alone and Combined at 55 ± 2.5° C., and Relative Humidity 15 ± 3 Per Cent.

hour. Figure 1, as well as Table II, Part I show these comparisons.

The small variation in the units of color difference data for duplicate tests made under the same conditions, is shown in the four parts of Table II.

These results indicate that combining the two gases resulted in reducing rather than increasing the degree of fading. Explanation of this possibly lies in the following. Examination of the inside of the gas inlet flange connection after using the combination of gases showed the presence of a white deposit which had not appeared after previous tests. Apparently the gases reacted with each other under the prevailing conditions as they entered the air pipe. Reactions were no doubt similar to those which take place in the Chamber process for producing sulfuric acid from sulfur dioxide. The product or products of the reaction either were not entering the oven in appreciable quanti ties, or they were less destructive of color than the oxides of nitrogen alone.

TABLE III

Visual Evaluation of Color Changes Resulting From Normal Exposure to Atmospheric Gases and Those Resulting From Exposure to Various Gases.

Test Fabric: Fabric Number 7, Blue-Green Crepe of Viscose and Cellulose Acetate Rayon.

Test Conditions: Rate of Gas Flow: 100 cc. per hour.
Oven Temperature: 55 ±2.5 °C.
Oven Relative Humidity: 15 ±3 per cent.

Type of Gas	Description of Change	Rating* (Class)
Use exposure in an industrial community for a three-year period	Change of color to pink.	IV
D. Oxides of nitrogen	Deep pink	IV
H. Sulfur dioxide	No change	I
L. Combination of gases	Very slightly pinkish	II

Strength Changes

The effect on wet bursting strength of exposure to various gases in similar quantities has been shown in Table II, Parts I to IV. All changes were minor under the test conditions followed. This is in line with observations made on consumer garments dyed with gas sensitive dyes and sent into the textile analytical laboratory of the Ellen H. Richards Institute in order to find the cause of adverse performance during use. In most of such cases the color is impaired, but the strength of the fabric has not suffered materially.

Comparison of Exposure During Use With the Effects of the Various Gases

It was possible to compare the test exposures with ordinary exposure in the case of Fabric Number 7, the Blue-Green Crepe. Table III shows that, although slightly more intense, the fading which occurred when oxides of nitrogen were used under the conditions specified simulated the results found after an ordinary three-year wearing period. The use of sulfur dioxide alone had no effect, and the combination of gases caused less fading than the oxides of nitrogen alone or than that experienced during wear.

In Fabric Number 1 (Control 1), the fabric exhibiting the highest degree of fading, the spread in units of color difference between the set of conditions causing the greatest and the least degrees

of fading was only 1.3. In all other fabrics, the greatest degree of fading was caused by the conditions of 65 ± 3.5° C. and 15 ± 3 per cent relative humidity, although the spread between the highest and lowest color difference values was not great in any case.

The conditions of 55 ± 2.5° C. and 15 ± 3 per cent relative humidity gave fading results only slightly less severe than those of 65 ± 3.5° C. and the same relative humidity.

In view of the fact that the lower of the two relative temperatures and humidities, respectively, are easier to achieve and maintain than the higher, and in further view of the finding that these conditions gave gas fading results which simulated wear conditions very closely in a limited study of the latter, the combined temperature and humidity of 55 ± 2.5° C. and 15 ± 3 per cent relative humidity are recommended for the apparatus described in this report, with oxides of nitrogen alone as the destructive gas. The need for controlling the temperature and humidity in gas fading determinations previously had been established.

Summary

Of the gases used, oxides of nitrogen caused by far the greatest color changes in a series of observations on gas fading. Sulfur dioxide caused little or no fading. The use of a combination of the oxides of nitrogen and of sulfur, under comparable conditions, caused more fading than the sulfur dioxide alone, but decidedly less than the oxides of nitrogen alone. The effect of the sulfur dioxide appeared to be to reduce fading action when used in combination with oxides of nitrogen, undoubtedly because of an interaction of the gases under the prevailing conditions.

Nitrogen oxides were found to cause fadings most similar to those occurring during exposure under use conditions.

An apparatus for the control of temperature and humidity during gas fading determinations has been described, and conditions of its use have been suggested.

None of the treatments used in thi. study caused significant changes in wet bursting strength, indicating that the problem of strength loss is not serious in this connection.

Acknowledgment

The authors are indebted to The American Viscose Corporation, under whose sponsorship this investigation was conducted at the Ellen H. Richards Institute, The Pennsylvania State College.

This is the fifth in a series of reports on methodology studies related to gas fading, from the laboratories of the Ellen H. Richards Institute, sponsored by the American Viscose Corporation.

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• PATENT DIGEST •

Dyeing Azo Dyestuffs with Chromium Complex—Chromic Salts Added C, 4, 06

U. S. Pat. 2,434,173
(Am. Cyanamid Co., Mackenzie-Nestler, Jan. 6, 1948)

The disadvantages in dyeing azo dyestuffs with chromium complex (Neolan, Palatine Fast type, etc.) are well known. Generally high amounts of sulfuric acid have to be used. In dyeing from the customary strong sulfuric acid bath it has been observed that the shade obtained is very sensitive to changes in dyeing conditions such as time, temperature, acid conditions and the like. The inventors state that brighter and fuller shades can be produced by dyeing the products of this class *in the presence* of chromium salts of the trivalent chromium. Typical salts to be used here are: chromic acetate, formate, fluoride, and chloride. The difference between this process and standard methods (metachrome or top-chrome) is in that the operation is carried out here with *entirely* metallized dyestuff complexes. According to an example a chromium complex azo dyestuff obtained from a diazotized nitro-aminophenol and 2-amino-naphthalene-5-7- disulfonic acid is dyed in a sulfuric acid bath in the presence of chromic acetate for 1½ to 2 hours at the boil. The dyeings are clearer and fuller and more easily reproducible than dyeings obtained in the standard way.

References cited by the Patent Office are amongst others:

U. S. Pat. 2,000,794 (Ciba): Neolan compounds are dyed in dyebaths containing aromatic acids beside inorganic acid.

U. S. Pat. 2,134,453 (Durand, Huguenin): Relates to special chromatable azo dyestuffs prepared from aminosulfonic acids and diazo compounds of o-aminophenol.

U. S. Pat. 2,173, 410 (Geigy): Describes the manufacture of after-chromatable o-hydroxy-azodyestuffs.

U. S. Pat. 2,171,828 (Ciba): Relates to a process for producing chromiferous azo dyes (Neolans) by heating azo dyestuffs with trivalent chromium salts.

According to another reference (Ger. Pat. 587,361 1933) the wool dyed with a chromatable azo dyestuff is impregnated with chromate. The latter is thereafter reduced to chromic salt on the fiber. The dyestuff chrome complex is finally formed by boiling. The patent obviously does not relate to the specific azo dyestuffs containing complex bound chromium in the molecule.

PAUL WENGRAF

Metachrome Dyeing Process Cation Active Substances Added C, 4, 06

U. S. Pat. 2,434,178
(Am. Cyanamid Co., Royer-Amick, Jan. 6, 1948)

The metachrome process has many advantages over the top-chrome and the bottom-chrome process. The dyestuff is introduced at the same time with the mordant-forming metal salts. The dyes however which do not give good penetration have proved to be unsuitable up to now in the case of heavier shades. If, on the other hand, a penetrating agent, for instance a surface active cation active compound is added, this reagent is likely to react with the acid groups of the dyestuff and the metal salt to give insoluble complexes in the form of a scum which tends to stick to the fabrics, to stain them and

to cause irregular results. It has been observed that this troublesome scum formation can be eliminated by "colloidizing" the cation active agent, i.e., by mixing it with a colloid body such as dextrine or the like. So for instance, the cation active agent, prepared by the interaction of octadecyl guanidine bicarbonate with ethylene oxide, is pasted with dextrine and a small quantity of water, well homogenized, dried in vacuum and reduced to powder. This powder is blended with the chromatable dyestuff and dyed according to the usual metachrome method. The result is perfect in contradistinction to the dyeings obtained without using this kind of colloidized cation active assistants.

References cited by the Patent Office are amongs others:

U. S. Pat. 2,228,369 (Gen. Aniline): Wool is dyed at relatively low temperatures (60° C.) with acid dyes in the presence of cation-active non-sulfonated) substances, for instance, the reaction product of higher substituted amines with ethylene oxide, or with triethanolamine monostearic acid ester, etc.

U. S. Pat. 2,040,796 (Gen. Aniline): Dyeing with Palatine Fast dyestuffs is carried out with normal sulfuric acid quantities (less than usual in chromiferous dyestuffs) in the presence of a natural or synthetic protective colloid, for instance, a degradation product of casein with alkalies (termed here as lysalbinic or protalbinic acids) or in the presence of glue; also of compounds of the Peregal-type.

U. S. Pat. 2,181,800 (Am. Cyanamid): Colloidized insoluble azo dyes, for instance, a press-cake from diazo-dinitraniline and beta naphthol mixed and homogenized with dextrine and a formaldehyde-naphthalene-sulfonated condensation product.

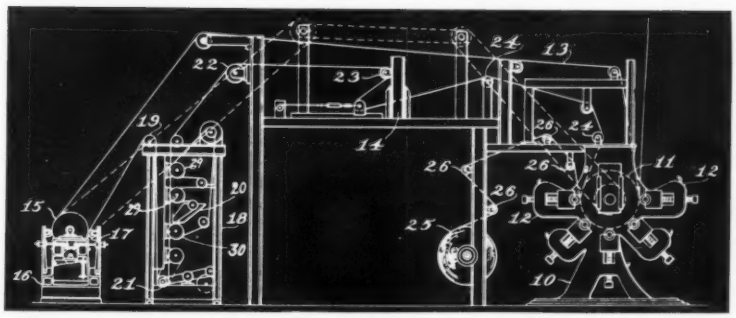
U. S. Pat. 2,145,193 (National Aniline Co.): Uses acid alkyl esters of inorganic acids (sulfuric or phosphoric acid ester of cyclohexanol or the like) as pasting agents for vat dyestuffs.

Other references are:

French Pat. 762,985 (Ciba) suggested to add urea or derivatives thereof for reducing the acid quantities in dyeing Neolan-type dyestuffs. Imp. Chem. Ind. recommended in French Pat. 821,992 adding small quantities of high substituted quaternary ammonium compounds in dyeing wool according to the metachrome dyeing method.

It can be concluded that the combination of metachrome dyeing procedure with cation active agents and protective colloids ("colloidized surface active agents") has not been proposed in any of the references here above.

Printing Machine, U. S. P. 2,434,013



Printing Machine—Applying Powder to the Printing Blanket — D, 3

U. S. Pat. 2,434,013
(Dewey & Almy Chemical Co., W. C. Ross, Jan. 6. 1948)

Corresponds to Brit. P. 583,647, digested in AMERICAN DYESTUFF REPORTER, 1947, p. 439. The matter may just be recalled by reproducing the accompanying drawing.

Dyeing Cellulose Acetate—by Adding Swelling Agents — C, 4, 07

U. S. Pat. 2,428,833-2,428,836
(Celanese Corp. of America, Croft-Hindle, Oct. 18, 1947)

These four patents are interconnected not only by having the assignors and the assignee in common but also by using similar methods for dyeing and printing acetate of cellulose in a more rapid way than before.

U. S. Pat. 2,428,833 relates to Indigosol dyeings. It has been discovered that organic derivatives of cellulose, thus principally cellulose acetate fibers, can be rapidly and solidly dyed in deep shades by adding to the dyeing bath an aqueous organic liquid (preferably lower alcohols) which has a swelling or softening effect on the fibrous material. The percentage of alcohol is quite high. It comprises, for instance, 70% of the total bath volume. In an example 3 p. Algosol Green IBW are dissolved in 250 p. water; 3 p. sodium nitrite and 590 p. ethanol are added and the fabrics are passed within two seconds through this solution in a pad. The further development is carried out by standard methods comprising drying and passing through dilute sulfuric acid at 95° F.

U. S. Pat. 2,428,834 suggests applying a similar treatment to "direct dyeing dyestuffs". This term is intended to include "all dyes producing their ultimate shade without any pre- or aftertreatment to effect a chemical change in dyestuff structure". Therefore these dyestuffs may belong to the typical acetate dyestuff class as well as to the acid group. Examples are the blue acid wool dye Colour Index No. 671, i.e., Erioglaucin A (Geigy) or Acid Brilliant Blue EG of Gen. Dyest. Co. The dyebath contains at least 60% ethyl alcohol and 1-8% of glacial acetic acid (or another lower acid). The dyestuffs are likewise applied on a padding mangle.

U. S. Pat. 2,428,835 refers like the foregoing patent to dyeing acetate rayon with acetate and acid dyestuffs (Azo Rubinol 3 GP). The innovation consists of padding the fabrics with dyestuff solutions containing at least 60% of an aliphatic alcohol, 1-3% of a thiocyanate (sodium-thiocyanate), as an additive swelling agent, and optionally 2-5% acetic acid.

U. S. Pat. 2,428,836 comprises an analogous printing method with acid dyestuffs on acetate rayon using about the same amount of ingredients as mentioned in the patents above. Examples of these dyestuffs are Xylene Fast Milling Blue (Sandoz), Polar Red G (Geigy), Pontacyl Brilliant Blue 2R (Du Pont) and many other well known acid dyestuffs. The printing paste contains, for instance,

5 p. Xylene Milling Blue GL

5.2 p. Acetic acid

76 p. Ethyl alcohol 95%

100 p. Gum tragacanth 6% to which composition 15 p. thiocyanate, dissolved in 25 p. water are added. It is particularly interesting to note that printing pastes of this type are obviously fixed by simple drying and washing in cold water, mildly soaping and drying at 110° C; They do not require any steam ageing operation.

It is claimed that all the dyes and prints, obtained according to any of the methods mentioned above, do not only exhibit a good all round fastness but also resistance to gas fading.

References cited for these four applications by the Patent Office are amongst others:

U. S. Pat. 2,292,433 (Celanese-Croft): Wool-acetate fabrics are dyed in dye-

baths containing acid dyestuffs, dissolved in 50% alcohol.

U. S. Pat. 2,274,751 (Celanese-Sowter): Acetate of cellulose is dyed with typical acetate dyestuffs of the anthraquinone type from aqueous dispersions of organic swelling agents mixed with chlorophenol.

U. S. Pat. 2,344,973 (Celanese-Croft): Dyeing of acetate of cellulose is effected in a padding machine, using a dilute ethanol solution of a typical acid or acetate dyestuff. The alcohol concentration is at least 70%. The fabrics are rapidly dried at elevated temperatures.

U. S. Pat. 2,218,628 (Celanese-Sowter): Acetate fibers are run through an alcohol-ethyl acetate-water solution of an acetate or Indigosol dye.

U. S. Pat. 2,196,270 (Celanese-Moncrieff): Dyeing aniline black on acetate rayon by using mixtures of alcohol and water for dissolving the usual ingredients such as aniline and cupric chloride.

U. S. Pat. 2,259,515 (Celanese-Croft): Cellulose acetate is dyed with different dyestuff groups in a bath containing 5-10% of a mixture of glycerine derivatives.

U. S. Pat. 2,248,048 (Celanese-Allan): A printing paste contains an insoluble acetate dyestuff, a high boiling solvent (diacetone alcohol) and an aqueous solution of alkyl cellulose, for instance "Colloresin".

Other references are:

U. S. Pat. 1,929,573 or Brit. P. 470,333: Acetate rayon is printed by dissolving the acetate dyestuff first in an organic solvent (ethylene dichloride) and dispersing this solution in tragacanth thickener. U. S. Pat. 1,968,855-6 (Celanese-Rivat): dissolving the dyestuff in ethyl-acetate; Brit. P. 466,803 (Celanese): extending this method on direct or acid dyes; Brit. P. 438,835 (Celanese): pyridine is used as a solvent for acetate dyestuffs and so on.

It can be seen from these references that quite generally the application of organic solvents in dispersing or dissolving acetate dyestuffs for printing or dyeing acetate rayon has been exclusively and exhaustively been developed by Celanese Corp.

CROSS REFERENCE

Printing Cellulose Acetate by Using Swelling Agents — D, 2, 07

U. S. Pat. 2,428,836
(Celanese Corp. of America, Croft-Hindle, Oct. 14, 1947)

A method for printing acid dyestuffs on acetate rayon has been reported in group C, 4, 07.

Dyeing Apparatus for Yarns—Application of Wicks — C, 6

U. S. Pat. 2,432,404
(Textron Inc., Galatioto, Dec. 9, 1947)

Dyeing of textile materials as far as yarn dyeing procedures are concerned requires expensive equipment, high liquor

Dyeing Apparatus
U. S. P. 2,432,404

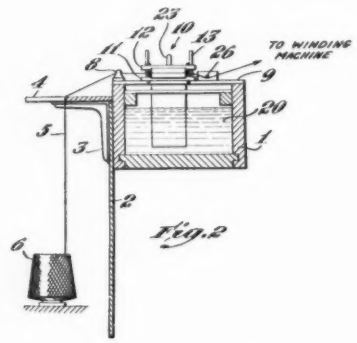


Fig. 2

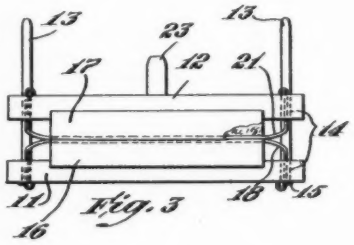


Fig. 3

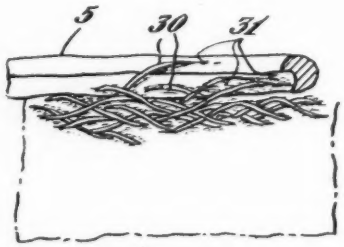


Fig. 5

ratios and moreover considerable time for exhausting the dyebath. The degree of exhaustion, also the temperature, has to be watched carefully to give consistent results. The present invention aims at finding a method for continually dyeing yarns without interrupting other manufacturing operations and without using one of the standard dyeing apparatuses. Winding and rewinding, as necessary in customary dyeing processes, should be avoided. The present method is based on the discovery that fibers can uniformly be wet out and dyed at a high speed by contacting the yarn at relatively small areas *with a film of the solution* under moderate pressure. This film, surrounding the fiber, may be drawn along the fiber's surface or vice versa the fiber might run against the contacting dyestuff solution film. It has been found that under such conditions, which might better be explained by the accompanying drawing, the dye can be evenly distributed throughout the whole length of the filament. The depth of the shade is exclusively determined by the rate of pick-up of the dyestuff solution. This rate can well be checked by regulating the speed of the yarn or by changing the concentration of the dyebath. It will be seen from Figure 2 that the dyestuff solution (20) is placed in a tank (1). The yarn, wound for instance on a bobbin (6) is led through the guide (8) to the applicator (10), fixed upon a bridge (9) above the dye tank (1). Two *wicks,* consisting of masses of felted wool (16 and 17) which are shown in an enlarged detail in Fig. 3 are clamped together by vertical guide posts (13). The wicks are sufficiently long to overtop the bridge and to dip either on one or on both sides into the dyebath in (1). The characteristic of this new construction is in an adequate condition of the felted wool masses. They must *not mat together* and contain as much as possible of loose fine fibers, preferably with the tapered ends directed outwardly. A steady capillary flow of the dyestuff solution through the fibers has to be secured in order to obtain even results. The procedure is also illustrated in a schematic drawing in Fig. 5: the filament (5) comes in contact with a great number of fibers (30), saturated with the dyestuff solution, flowing out of the capillaries (31). The numerous fiber ends apply this solution practically to every point of the strand. An essential part of this process consists of maintaining the temperature in certain limits so that a thorough penetration, excluding a premature evaporation, might occur. Dyeing tests with Erio Orange, Pontamine Fast Yellow and Chloramine Blue showed a perfect exhaustion and a faultless matching of the single batches.

Reference cited by the Patent Office, amongst others:

Brit. P. 366,585 (Brit. Celanese): Protects an apparatus for applying liquids to textiles especially for lubricating purposes by passing the textiles through two pairs of bars or blocks or the like, pressed together and provided with adsorbent material, for instance, wicks which are supplied with the lubricating agent.

Other reference: Applying of *sizing liquids* by wicks has been described in several publications, for instance, in Swiss Patent 175,322 (Dietrich). The use of a loose wool mass, acting by the capillarity of the tapered ends of the fibers for dyeing purposes however is specific for the present invention.

Proceedings of the
American Association of Textile Chemists and Colorists

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JUNE 14, 1948

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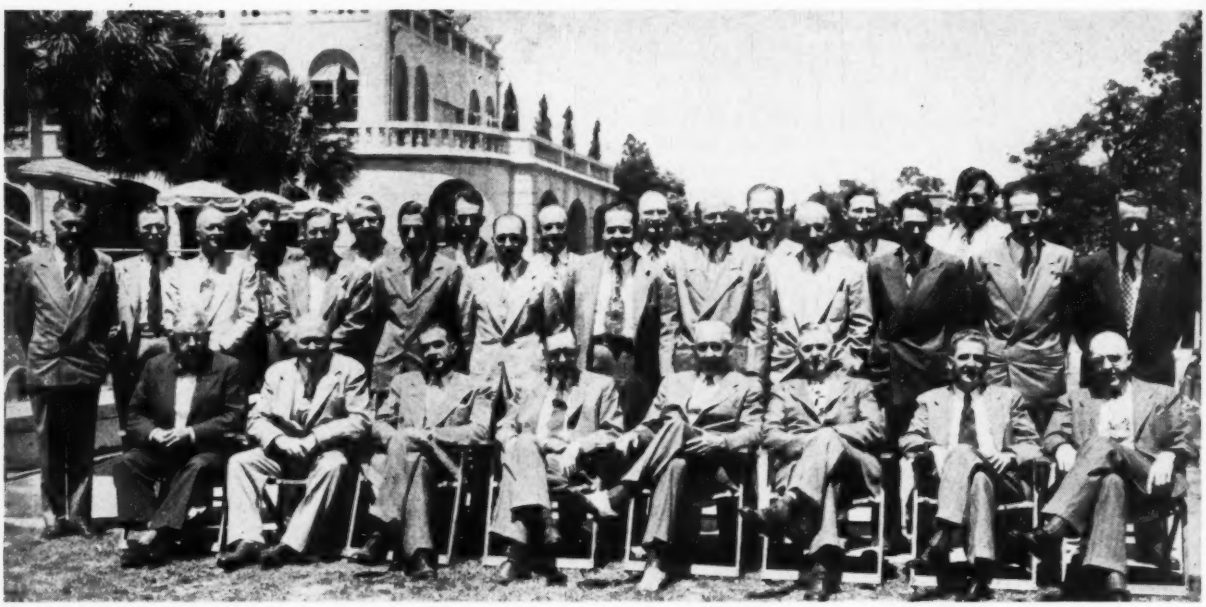

Committee chairmen in attendance together with some members of a few of the committees. These pictures were taken in front of the Sheraton Bon Air Hotel, a portion of which appears in the background.

Meeting of Committees for Augusta Convention

D. C. NEWMAN, General Chairman for the Twenty-Seventh National Convention presided over a meeting of all the chairmen and committee members at the Sheraton Bon Air Hotel in Augusta, Georgia on Saturday, May 8th.

Reports from all the committee chairmen clearly indicated that their work was well underway and indications are that the Augusta Convention will be regarded as among the best conventions the Association has held.

The Committee on Reservations, headed by Thomas R. Smith, stated that reservations would not be accepted by the hotel and that reservations would be handled by the Reservations Committee. Mr. Smith further stated that application blanks for rooms are to be sent out early in July and they should be returned not later than August 10th. No room reservation will be confirmed until after August 15th. The Reservations Committee is doing everything possible to see that accommodations are available for all members attending the Twenty-Seventh National Convention.

The Committee on Transportation, headed by L. E. Whittelsey, is taking care of preparing train and plane schedules to and from Augusta to all the principal points from which our members will come, and they are also taking care of

CHAIRMEN OF COMMITTEES—front row, left to right—John Neely, J. A. Franklin, D. C. Newman, T. R. Smith, and V. B. Holland; back row, left to right—Charles Spratt, J. L. Wyman, Jack Anderson, A. K. Haynes, Junius M. Smith, Laurie Whittelsey, W. B. Griffin and A. R. Thompson.

Left to right—J. A. Franklin, Assistant General Chairman, D. C. Newman, General Chairman, and T. R. Smith, Past National President and Chairman of the Reservations Committee.

arrangements to transport our members from the railroad stations and airports to the hotels.

The Committee on Entertainment, headed by Robert W. Philip, assisted by P. G. Wear, has arranged a most unique and enjoyable Southern style entertainment for the several meetings during the convention.

The Registration and Reception Committee, headed by A. K. Haynes, is arranging a unique and effective system of registering members so that there will be a minimum of delay in dispensing with the preliminary details as each member arrives.

Reports from the Banquet Committee, Chairman Jack Anderson, and the Dining Committee, Chairman J. L. Wyman, show that they have made careful plans so that everybody will be properly fed in true Southern style.

The Ladies Committee, Chairman W. B. Griffin, has elaborate plans for entertaining the lady guests attending the convention.

Other committees which will report later have clear-cut ideas and plans to carry out their work.

The Publicity Committee, Chairman A. R. Thompson, has organized plans for notifying the members and the public regarding the activities which are planned. Reports and stories on the convention plans will be sent regularly from now on until the convention meets in Augusta in October.

—♦ ♦—

Meeting of the Pacific Coast Section

THE organization meeting of the Pacific Coast Section followed a dinner at Mona Lisa Restaurant in Los Angeles, Calif. on April 28, 1948, with fifty members present. The meeting was called to order by H. A. DesMarais, Secretary *pro tem*, and a Nominating Committee appointed, consisting of John G. Ferguson, John Smith and Leon F. Olsen. There were nominated and elected—

Chairman—Frank P. Brennan, U. S. Testing Co., Los Angeles, Calif.

Vice Chairman—Benjamin O. Race, Standard Dyers and Finishers, Los Angeles, Calif.

Secretary—H. A. DesMarais, General Dyestuff Corp., San Francisco, Calif.

Treasurer—Sidney Springer, Los Angeles, Calif.

Sectional Committee—A. H. McKenzie, Portland Woolen Mills, Portland, Ore.

Kenneth R. MacDowall, Paramount Flag Co., San Francisco, Calif.

Leonard Girling, Arthur Bone, Inc., Los Angeles, Calif.

Frederick L. Wilhelm, American Aniline Products, Inc., Los Angeles, Calif.

Enthusiastic discussion followed, with every indication that the new Section would follow the successful example of the older eastern Sections.

Respectfully submitted,
H. A. DesMarais, *Secretary.*

Meeting of the North Carolina State College Student Chapter

AT a meeting of the North Carolina State College Student Chapter on Thursday, April 29, the speaker was Dr. Carl W. Maynard of E. I. duPont de Nemours & Co., Inc., on "Dyestuff Chemistry," with particular reference to azo dyes.

Respectfully submitted,
John R. Cramsie, *Secretary.*

—♦ ♦—

LTI Student Chapter Annual Meeting

THE Annual Meeting of the Lowell Textile Institute Student Chapter was held on May 4. The following were elected to office for next year:

Chairman—Lawrence C. Gardner.
Vice-Chairman—George D. Kenniston.
Secretary—Joan L. Gregg.
Assistant Secretary—James W. Sweeney.
Treasurer—Robert J. Peirent.

Chairman Bianco thanked the following members for their support during the year:

Peter McKone, for the efficient manner in which he handled the joint meeting with the Northern New England Section;

Eleanor Foley, for her capable handling of the Student Chapter's finances;

Albert Hoyle, for the successful membership drive which his committee conducted;

George Kenniston, for his presentation of excellent technical programs and outstanding industrial men;

Allen Frank, for his effective publicity work and for the part he played in the joint meeting program; and

Ernest P. James, our Faculty Advisor, whose advice was invaluable.

Respectfully submitted,
Lawrence C. Gardner, *Secretary.*

MEMBERSHIP on MAY 1, 1948

	Senior	*Junior*	*Associate*	*Student*	*Total 1948*	*1947*	*1946*	*1945*	*1944*	*1943*	*1942*	*1941*	*1940*	*1939*	*1938*
Northern New England	446	37	64	3	550	556	528	469	402	407	398	391	349	327	311
Western New England	79	8	9	1	97										
Rhode Island	438	25	45	3	511	501	471	405	348	352	341	337	332	295	284
New York	1048	73	163	1	1285	1262	1167	1008	817	707	651	606	538	483	451
Philadelphia	771	30	69	1	871	833	740	644	550	513	517	475	447	381	369
Piedmont	444	23	43	1	511	492	434	366	326	286	309	297	293	277	247
South Central	100	3	7	1	111	102	100	87	83	72	80	71	61	63	56
Southeastern	174	12	23	—	209	198	166	141	141	146	175	142	137	133	109
Mid-West	284	10	42	1	337	326	287	261	209	198	194	193	180	157	158
Pacific Coast	67	3	11	—	81										
Student Chapters	—	—	—	240	240	142	50	14	20	56	117	80	59	51	57
Unclassified	193	21	72	—	286	286	237	199	151	122	82	87	80	71	65
	4044	245	548	252	5089	4698	4180	3594	3047	2859	2864	2679	2476	2238	2107
Corporate					300	299	302	299	184	82	77	33	33	32	30
				Totals	5389	4997	4482	3893	3231	2941	2941	2712	2509	2270	2137

Progress Reports

Presented at Research Committee Meeting

April 2, 1948

Water-Resistance

A meeting was called to order on April 1, 1948 by the chairman, Mr. Allen. Mr. Little was called upon to give an introduction to the current problem concerning the Federal Trade Commission. He outlined the methods of test for the proposed commercial standards as follows:

1. *Spray Test*
   a. After *three launderings*
   b. After *three dry cleanings*
2. *Rain Test*

He pointed out that the first test indicates how well durable and renewable finishes stand up to laundering and dry cleaning. The rain test is a measure of the rain resistance of fabrics. Mr. Little also stated that the rain test has shown that double thickness-fabrics are much more resistant to water penetration than twice the value obtained with a single thickness. Also, an absorbent backing has a wicking effect which lowers the resistance of a fabric.

Mr. Fickett of the Textile Fabrics Association spoke of complaints with regard to incorrect labeling of the current interest to set up standard methods to be used for classification purposes.

Mr. Slowinske enlarged upon the proposed test methods with regard to laundering and dry cleaning. He said that three different methods for dry cleaning were under consideration. It was emphasized that any fastness tests which are set up should be severe enough to show difference between *durable* and *non-durable* finishes.

Mr. Dorn and Mr. Little discussed the relative merits of using Stoddard solvent or dry cleaning solvent containing soap. Mr. Borghetty pointed out that three rinses with fresh Stoddard solvent would remove practically all the soap, but said that this procedure does not correlate with field practice where three rinses are not used. Mr. Kahn said there have been practically no complaints with respect to residual soap after dry cleaning. Mr. Little suggested that inter-laboratory tests be conducted to find out the importance of soap in dry cleaning. Mr. Borghetty said that his laboratory had done considerable work along this line. Opinions about this subject were expressed by Messrs. Bellwova, Pingree, Nute, Dorn, Slowinske, and several others present. It was pointed out that the Dry Cleaning Committee had already done considerable work along this line but that their methods had not been accepted by the Water-Resistance Committee.

Mr. Little then made a motion that a committee of three or more be appointed to study the importance of soap in dry cleaning and to work out a dry cleaning test. This motion was carried and the following committee was appointed:

George A. Slowinske, *Chairman.*
Charles W. Dorn.
Hector C. Borghetty.
Carl R. Bellwova.
R. A. Pingree.
Alden D. Nute.

A lengthy discussion then ensued with respect to a report on the comprehensive comparison of various water resistance test methods written by George J. Mandikos, research assistant at Lowell.

Ralph Orben, representing Capt. Prien of the Naval Clothing Depot, started the discussion by making reference to the recent article written by Mr. Slowinske and to the report under consideration. He said that in both papers an analysis reveals that the DuPont Rain Tester correlates fairly well with the Rain Room at a low level (viz. 2 feet) but that the Drop-Penetration was considerably better at the higher level (viz. 8 feet). It is possible to have a high *rank* correlation and no *real* correlation. Mr. Slowinske pointed out that the versatility of the DuPont Rain Tester, which employs water syray of varying intensities, furnishes an over all picture not shown by any other tester. Mr. Landsberg agreed with Mr. Slowinske in general.

Mr. Orben wanted more information with regard to sampling procedure and reproducibility of the results since he was chiefly interested in the report from a statistical viewpoint.

Mr. Mandikos pointed out that a satisfactory number of test specimens had been used in practically all test methods except in the case of the Bureau of Standards Rain Room. He emphasized, however, that the latter tests were conducted incidentally and that tests in the Philadelphia QM Depot Rain Room were not made as had been planned. Unfortunately, the Rain Room at Philadelphia was unavoidably dismantled before the desired tests could be conducted. Mr. Mandikos expressed the hopes of himself and several others that the Philadelphia Rain Room would be in operation again soon and that the desired tests could be run, and thus furnish results from which more firm conclusions could be drawn. It was pointed out that the conditions of tests were considerably different between the two rain rooms.

A fairly long discussion then followed and all members present took an active part. Several constructive suggestions were made. It was felt that more tests should be performed in the N.B.S. Rain Room and that tests should be made in the Philadelphia Rain Room whenever possible in the future.

Mr. Freedman presented an outline of the proposed tests he will make with natural rainfall and agreed to test the fabrics now available at Lowell.

Mr. Landsberg offered to supply fabrics to the AATCC Research Laboratory at Lowell on which pertinent data were available.

Mr. Orben pointed out that the hydrostatic pressure tester showed the best *real* correlation with the rain room.

There was some discussion about improving the present tentative AATCC (DuPont) Rain Tester, particularly with reference to the spray nozzle. Chairman Allen spoke of the work on spray nozzles which was done at the Institute of Textile Technology.

GEORGE J. MANDIKOS,
Acting Secretary.

Flammability of Consumer Textiles

At the January meeting, it was decided to reduce our standard from that of a

permanent status again to a temporary one. The reason was lack of correlation in inter-laboratory tests, especially on tufted fabrics. In order to eliminate these differences if possible, we have since then had our six laboratory testers inspected and normalized by U. S. Testing Company. We studied and on the strength of inter-laboratory results revised our method of drying test samples. It was found that for such high pile fabrics the samples should be dried horizontally on thin wire racks and the time should be extended from 15 to 30 minutes.

The National Cotton Council has meanwhile collected a series of fabrics which will soon be tested by six laboratories not only on our machine, but also on six National Bureau of Standard's horizontal testers and in two of these laboratories on a machine which the Fire Marshal of California has developed. We are, however, doubtful that even with all precautions, perfect correlation on all fabrics will ever be obtained, on account of the physical differences in test samples from the same piece of material. Our investigation brought out that three laboratories had from 25-50% variations in weight of individual tufts of chenilles which may well explain the variations in flammability.

H. E. HAGER, *Chairman.*

Dimensional Changes in Textiles

The work of the Sub-Committees on Dimensional Changes in Wool during the past months and the work proposed for the future, is covered in the attached reports of Arthur Anderson and Joseph Goodavage.

In addition to the information contained in these two reports the following material which was discussed at a Committee Meeting on April 1, 1948 is available:

It was decided that the washability of woolen fabrics would be judged by two different methods, namely machine laundering and hand laundering. The temperatures in both instances would be held at 100° F. The discussion brought out the fact that the word "launderable" implied that the article could be laundered by machine. If the article in question could not withstand machine laundering, then it should be referred to either as "hand washable" or "dry-cleanable," depending upon which cleansing method it could withstand. The decision to establish 100° as the maximum temperature was based upon the practice of laundering woolens in commercial launderies, where the temperature has been established at 100°, and the fact that almost all home laundering of items containing wool are carried out at that temperature.

Socks from the 1200 pairs mentioned in the attached report of Mr. Goodavage, will be used in different ways. Some will be sent to various concerns for evaluation by their test methods, others will be laundered by the accelerated Quartermaster laboratory test at 140°, and others by automatic home laundering machines. It is proposed also to have large numbers of these socks submitted to wear tests either by the Army or the Police Department in Philadelphia. The purpose of these consumer tests is to secure a check on the reliability of the laboratory laundering test as a measure of consumer performance.

W. E. COUGHLIN, *Chairman.*

Boston Area Wool Shrinkage Committee

The first investigation undertaken by the Boston Area Wool Fabric Shrinkage Committee in pursuit of the objective of establishing a standard method for testing wool shrinkage consisted of a checkup of test methods now in use in a number of laboratories for determination of the correlation in test results that might be obtained. It was considered particularly desirable by the Committee to establish the relationship of Pacific Mills' accelerated wash test involving a prolonged washing period with commercial laundering practice, home machine washing, dry cleaning (wet cleaning) practice and the CCCT191A test.

The Committee at the time of the initial meeting was quite unanimous in believing that wool washing tests should be accompanied by a relaxation determination so that the shrinkage attributable merely to sponging could be differentiated from contraction due to felting. Therefore, in the tests conducted by the cooperating laboratories (with the exception of the American Institute of Laundering which uses no relaxation test in present practice) the fabrics were relaxed through some type of water soaking treatment.

Four all-wool fabrics, a maroon worsted identified as "R-20-A untreated" and "R-20-B stabilized" and a green wool flannel identified as "S-1316A untreated" and "S-1316B stabilized" were supplied by the Pacific Mills in sufficient amount to provide test samples for the seven participating laboratories. The nature and type of shrinkage and relaxation tests conducted by the various laboratories are noted below:

Arlington Mills—CCCT191A.

American Woolen Company—CCCT 191A.

The Derby Company—CCCT191A formula using home washing machine (Graybar). Water spray relaxation.

American Institute of Laundering—Commercial laundering method employing Prosperity 35# washer operating at low speed, with formula of three 5-min. suds and four 3-min. rinses at 100° F., neutral soap. After washing fabrics were centrifuged and steam pressed.

Pacific Mills—Relaxed by spraying with cold water, centrifuging, pressing. Washed in washer operating at 21 r.p.m. with 75 min. sudsing operation at 100° F., followed by two 5-min rinses with water at 100° F. After washing fabrics were centrifuged, pressed, cooled. This laboratory also conducted tests wherein measurements were made under water and provided data and comments appearing later in this report.

New England Testing Laboratory—Washing test conducted with commercial laundry washer "Prosperity 36#" operating at 15 r.p.m. 10 lb. load. Formula comprised two 5-min. suds at 100° F. and four 2-min. rinses at same temperature. Neutral soap in sufficient amount to give good suds. High water levels in suds and rinses. Machine stopped while draining and filling. Fabrics centrifuged, dried, pressed and conditioned for 20 min. before measuring. Relaxation accomplished by 30-min. soaking in dilute soap solution at 100° F.

National Institute of Cleaning and Dyeing—The fabrics were first relaxed by laying them on a pressing machine, spraying them with water and at the same time steaming them with bottom steam. They were then turned on the reverse side and the process repeated. The fabrics were then rolled losely and allowed to dry in a room where the temperature was approximately 100° to 110° F. Finally the fabrics were pressed flat on a steam pressing machine.

The fabrics were wetcleaned by wetting them out with lukewarm water (90 to 100° F.), laying them on a wetcleaning table, hand brushing them with a neutral coconut oil soap, rinsing them by hand in lukewarm water, removing the excess moisture in a centrifugal extractor, and hanging (not tumbling) them in a drying cabinet at approximately 140° F.

WET MEASUREMENT METHOD INVESTIGATED BY MR. DALTON OF PACIFIC MILLS.—Following is the direct quotation from Mr. Dalton's report:

Shrinkages by this method are based on mesaurements made under water, both after relaxation and laundering.[1] The samples were marked 3 times in warp and filling directions and immersed in a .05%

[1] The Testing of Wool Fabrics for Shrinkage, J.T.I. Vol. XXX Pp. S29 (1939).

Shrinkage data including relaxation tests developed by the various laboratories participating in the investigation of wool shrinkage test methods—Boston Area Committee.

Laboratory	Fabric		Per Cent Shrinkage Based on Original Fabric Dimension: Relax	1 Wash	3 Wash	Felting Shrinkage
N. E. Testing	Green untreated	W	—10.7	14.2	19.8	9.1
		F	— 4.6	5.6	9.8	5.2
Derby Co.	Green untreated	W	— 6.5	17.3	25.0	18.5
		F	— 4.6	10.8	19.6	15.0
Am. Institute of Laundering	Green untreated	W	—	10.3	13.6	
		F	—	4.4	6.9	
Pacific Mills	Green untreated	W	— 7.5	20.5		13.0
		F	— 3.1	15.3		12.2
American Woolen Company	Green untreated	W	— 8.5	14.8	19.6	11.1
		F	— 4.3	8.6	12.6	8.3
Arlington Mills	Green untreated	W	—10.0	16.0	23.3	13.3
		F	— 4.7	9.9	14.2	9.5
Nat'l Inst. of Clng. & Dyeing	Green untreated	W	—11.2	12.2	11.2	0.0
		F	— 5.2	6.2	2.7	0.0
N. E. Testing	Green treated	W	— 2.3	2.8	5.7	3.4
		F	— 0.0	0.9*	0.0	0.0
Derby Co.	Green treated	W	— 0.6	4.2	10.2	9.6
		F	— 0.0	0.4	1.3	1.3
Am. Institute of Laundering	Green treated	W	—	1.1	3.9	
		F	—	1.9*	1.4*	
Pacific Mills	Green treated	W	— 0.1	3.4		3.3
		F	— 0.2	0.9*		0.0
American Woolen Company	Green treated	W	— 0.9	3.6	7.7	6.8
		F	— 0.8*	0.1*	1.1*	0.0
Arlington Mills	Green treated	W	— 2.0	4.9	9.4	7.4
		F	— 1.3	1.3	1.3	0.0
Nat'l Inst. of Clng. & Dyeing	Green treated	W	— 2.5	3.5	2.5	0.0
		F	— 1.0	2.0	1.5*	0.0
N. E. Testing	Maroon untreated	W	— 1.5	2.1	3.1	1.6
		F	— 1.5	2.5	2.5	1.0
Derby Co.	Maroon untreated	W	— 1.3	3.4	5.2	3.9
		F	— 2.3	1.5	2.9	0.6
Am. Institute of Laundering	Maroon untreated	W	—	1.9	1.9	
		F	—	0.6	1.1	
Pacific Mills	Maroon untreated	W	— 1.2	4.5		3.3
		F	— 0.1	1.3		1.2
American Woolen Company	Maroon untreated	W	— 0.8	2.6	4.3	3.5
		F	— 0.5	2.0	1.4	0.9
Arlington Mills	Maroon untreated	W	— 1.5	2.2	3.8	2.3
		F	— 0.0	0.2	0.1	0.1
Nat'l Inst. of Clng. & Dyeing	Maroon untreated	W	— 1.7	2.7	0.2	0.0
		F	— 2.0	3.0	1.0	0.0
N. E. Testing	Maroon treated	W	— 0.6	1.7	1.7	1.1
		F	— 4.2	5.2	5.2	1.0
Derby Co.	Maroon treated	W	— 0.0	1.3	4.2	4.2
		F	— 1.3	2.5	3.1	1.8
Am. Institute of Laundering	Maroon treated	W	—	1.4	1.4	
		F	—	2.2	2.5	
Pacific Mills	Maroon treated	W	— 0.4	1.5		1.1
		F	— 1.9	2.6		0.7
American Woolen Company	Maroon treated	W	— 0.0	1.2	2.1	2.1
		F	— 2.3	3.0	3.8	1.5
Arlington Mills	Maroon treated	W	— 0.3	1.1	2.0	1.7
		F	— 2.0	2.5	2.5	0.5
Nat'l Inst. of Clng. & Dyeing	Maroon treated	W	— 0.6	0.6	0.6	0.0
		F	— 3.0	3.0	1.0	0.0

Nacconol solution for 15 minutes at 90° F. The specimens were placed in a shallow tray and the measurements were made under water with a stainless steel rule graduated directly in percentage. The samples in 3 lb. load were laundered in soap for 75 minutes at 100° F. then given two rinses of 5 minutes each at 100° F. with clear water. The wet samples were taken from the wash wheel and measured under water again for laundry shrinkage.

ADVANTAGES

A. Saving of time.

B. Pressing is eliminated and correspondingly, fluctuations in mesaurement due to pressing.

C. Centrifuging or squeezing is eliminated and correspondingly fluctuations in measurement due to compression in centrifuging and stretching in squeezing.

D. Rate or manner of drying have no effect on shrinkage determination.

PER CENT SHRINKAGE:

		(A) Relaxation Shrinkage	(B) Laundry Shrinkage	(B—A) Felting Shrinkage
S/1316-A	Warp	7.5	18.0	10.5
Untreated	Filling	2.9	12.4	9.5
S/1316-BI	Warp	0.7	3.3	2.6
Treated	Filling	—0.9	0.7	—0.2
S/1316-BII	Warp	0.7	3.4	2.7
Treated	Filling	—0.9	1.1	0.2
R/20 A	Warp	0.2	3.1	2.9
Untreated	Filling	—1.7	—1.6	0.1
R/20-B	Warp	0.4	0.2	0.2
Treated	Filling	—0.8	—0.3	—0.5

Method II in comparison to Method I will give reproducible results in relaxation shrinkage.

The chief disadvantage of Method II, however, is any shrinkage due to drying is not considered therefore, the method does not measure the dimensions of a fabric in actual use. This disadvantage is less important since the method does provide a device for achieving reproducible shrinkage results especially in woolen fabrics.

The felting shrinkage of the untreated or control fabric varies widely and cannot be reproduced by either method. This is due to factors concerned with the actual laundering or behaviour of the samples in the wash wheel.

* * * * *

An examination of the data developed by these tests suggests certain conclusions such as:

a. The relaxation shrinkage where spraying is used as the wetting process is appreciably lower than that obtained through soaking of the fabric or through a combination of spraying and steam pressing.

b. The lowest shrinkages were obtained by the National Institute of Cleaning and Dyeing as might be expected because a hand treatment was employed. Of the machine washed fabrics those processed by the American Institute of Laundering showed the lowest shrinkages while fabrics washed in a home washing type machine revealed the highest shrinkages.

c. The two laboratories using the CCCT191A method showed generally good correlation in felting shrinkage results although higher shrinkages were obtained in the case of the green woolen treated fabric than was shown by the laboratories using a commercial laundry washer.

d. The shrinkage caused by the prolonged treatment employed by the Pacific Mills was lower in the case of treated fabrics than that resulting from the cumulative effect of three washings according to the CCCT191A method but approximated those results in the case of the untreated fabric.

e. The maroon worsted fabric evidently because of inherent resistance to washing showed low shrinkage both untreated and treated indicating that the type of washing procedure used within the limits of those investigated is of much less significance with worsteds than with woolen easily felted fabrics.

In conclusion, I regret that I am not in a position to express the viewpoint of the Committee concerning the work to date and the direction to be followed in the further investigation of the matter of a standard wash test method for wool—because no meeting has been held since these data were accumulated.

It is evident, however, from the shrinkage results obtained that a woolen unstabilized fabric will show high shrinkage in almost any machine washing test method. On the other hand, if we consider

the green woolen stabilized fabric as a typical example of a fabric that might be submitted to a laboratory for a shrinkage test—the shrinkage results obtained would vary to a very marked degree depending upon the type of washing procedure used and this would be particularly true if the test were carried through three washings. With worsteds, as typified by the maroon treated fabric, the generally low shrinkages obtained by all methods indicates that a latitude in testing methods would not be too serious.

Again without attempting to anticipate the viewpoint of the Committee it might seem desirable to temporarily adopt the Pacific Mills' prolonged wash test since it does approximate the results obtained in three commercial launderings wherein a special low speed wool washer is employed. Wool fabrics are either dry cleaned, wet cleaned by hand by the dry cleaner, machine washed by the dry cleaner, hand washed at home or sent to the laundry. Home washing machines generally exert strenuous mechanical action and the average consumer would not think of washing a wool garment in a washing machine. A wash test cannot be expected to depict the results of generally accepted malpractice in the washing of wool such as high temperature, high speed, highly alkaline washing, but should show shrinkage results consistent with the accepted good practice in wool washing, in the home, in the laundry and in the dry cleaning plant.

ARTHUR ANDERSON.

Evaluation of Shrinkage Controlled Wool Socks

PURPOSE OF THE SUB-COMMITTEE—This is a sub-committee of the "Committee on Tests for Dimensional Changes and Wash Fastness of Textiles". The objective aimed at is to develop an accelerated laboratory test procedure by which it would be possible to evaluate the effectiveness of any shrink controlled process as applied to wool socks or wool hosiery.

CO-OPERATION WITH NAHM.—The matter of co-operating with the National Association of Hosiery Manufacturers was discussed with Earl Constantine on September 16, 1947, and through his efforts a joint meeting of the committee on wool shrinkage of the NAHM and the AATCC Sub-Committee was arranged for November 6, 1947, at the offices of the NAHM.

JOINT MEETING WITH NAHM.—In this meeting it was pointed out that it would be necessary to evaluate the commercial shrinkproofing methods after these were applied to wool socks. It was pointed out by Mr. Constantine that the NAHM is not interested in evaluating the different shrink resistant treatments and comparing the merits of one against the other, nor will it criticize or endorse any method. The NAHM is only interested in developing an accelerated laundering test by which its members would be able to evaluate a shrink resistant treatment on wool hosiery and be able to translate it in terms of a given number of consecutive launderings.

Mr. Goodavage, Chairman of the AATCC Sub-Committee, pointed out that the AATCC is an impartial organization whose aims are to develop test procedures for the textile industry without becoming involved in any controversial arguments or opening itself to any criticism in developing such tests. The AATCC therefore concurs in the policy as outlined by Mr. E. Constantine.

TYPE OF SOCKS TO BE TESTED.—It was the consensus of the joint committees that the type of socks to be used in the evaluation work would be the all-wool anklet type made of 60-64s wool of plain knit construction made on a 132 needle machine. The socks should be preferably knit on the same machine. After knititng the socks are to be scoured and boarded to size.

CODING OF TREATMENTS.—The socks are to be sent to the offices of NAHM and from this point they will be distributed to the different companies who will apply their respective shrink resistant treatments. After being treated and boarded to size the treated socks will be returned to the offices of NAHM where they will be coded and then distributed to the various laboratories for evaluation purposes.

EVALUATION TESTS. — Representative samples of the various treated socks will be subjected to the following:

(1) Ten consecutive Army wool launderings—including dry tumbling.

(2) Home laundering.
(Bendix automatic)
G. E. Spinner type (automatic).

(3) Wear test—20-25 individuals—hand launderings.

(4) Laboratory Accelerated test.
Army Q. M.—140° F.—5 lb. load.

EVALUATION OF RESULTS. — The Schiefer machine will be used to evaluate felting shrinkage. The weight of this machine will be modified to suit conditions.

The test program is based on ten consecutive Army wool formula launderings —this is the yardstick, and is the standard for comparison against which the results of the accelerated test will be compared. For example, if the treated socks (shrink controlled) hold up to eight or ten consecutive launderings this data will be compared with results obtained by the present U. S. Army (Q. M.) accelerated tast at 2 hours, temperature 140° F. If this accelerated test is found to be too severe then it will be modified in temperature or time until the results compare with ten launderings (Army wool formula), as well as with the data from the other tests listed above.

NOTE.—In the meeting of December 9, 1947, of the AATCC Sub-Committee it was decided to change the style of socks from the anklet to the full length. This decision was brought about after it was decided to include the Wear test. Therefore, if the Committee of NAHM is agreeable, it is recommended that 1200 pairs of full length socks be made available for this evaluation.

J. E. GOODAVAGE.

Fastness to Washing

It is custom for active Research Subcommittees to have meetings on the day preceding the meeting of the National Research Committee.

The Chairmen of active Research Subcommittees are obligated to report to the meetings of the National Research Committee on the immediate past, current and planned future activities of their committees, and the custom of previous day meetings by the Research Subcommittees aids the Chairmen to fulfill this obligation.

Naturally, if nothing useful can be accomplished by a meeting of an active Research Subcommittee on the day preceding the meeting of the National Research Committee, the Research Subcommittees do not adhere to the custom.

There are 2 separate major projects underway by and for this committee. They are:

Research associate, Harlan E. Glidden, is giving full time and research associate George J. Mandikos, part time, under the supervision of the Director of Research Dr. Stiegler, at the Lowell Textile Institute,

a—to learn how to increase the severity of the No. 3 wash test for cotton in the Launderometer;

b—to learn the effect on the degree of color destruction in washing by variations in the different conditions that compose the washing operation, and

c—to learn can wash tests be made more economically effective and/or more reliably indicative of practical performance

by modifications in the present Launderometer, or through the construction and use of a different form of test apparatus.

Worthwhile progress has and is being made in all 3 of these studies. In respect to

a—it is established that abrasive action can be increased in the present Launderometer by using in the jars with the test specimen 2 to 4 small bags filled with very small diameter stainless steel balls to make a weight of 1 ounce. This increased abrasive action can be still further increased by using a different type jar, longer in length and of less diameter. This increases the force with which the test samples strike the narrower ends of the jar because of a greater length of drop, or slide.

It is not yet established how 1 test by this procedure compares with some number of repeated tests by the present procedure in the present jars. This work will be started in the near future as soon as the committee can obtain standard test fabrics. A separate subcommittee is at work to develop the standard test fabrics.

b—progress on this is encouraging and will be made the subject of a separate report in the not too distant future.

c—this study is related to and dependent on the information developed by the other major project underway, and which is concerned with a study to learn:

1—how many commercial and/or home laundry washings do textiles for personal wear clothing receive during their useful life,

2—are these fabrics discarded because of color or physical failure,

3—how much color change from the original do textiles exhibit when they are discarded because the appearance of the color is no longer satisfactorily useful for the purpose for which the fabric was purchased.

The American Standards Association, Sectional Committee L-14 on Textile Test Methods has appointed a Survey Subcommittee to gather this information. This subcommittee is composed of:

James R. Stirling, Chairman: American Institute of Laundering, H. R. Bellinson, Cluett, Peabody Company.

Earle M. Edgerton, National Association of Finishers of Textile Fabrics.

Elizabeth Ramsey, Good Housekeeping Institute.

J. R. Bonnar, AATCC.

This Survey Committee will prepare a questionnaire to be given wide publicity to develop the information for questions 1 and 2, and exhibit to women in Department Stores, at meetings of Womens' Clubs and at other suitable gatherings of women, fabrics for different personal wear uses that have been subjected to repeated washings to exhibit different degrees of color change from the original. The original material will not be shown at these meetings; only the washed pieces and the women will be requested to state which of the washed fabrics they consider serviceable, and which no longer serviceable for the original use for which they were purchased.

17 of the fabrics used by the Wash Committee for repeated washings by commercial laundries and in home laundry washers were prepared for this study and on examination, the Survey Committee decided that they were not sufficient in range in respect to end uses.

Through the efforts of Charles W. Dorn, Walter Stout, one of the men concerned with the purchase for the J. C. Penney Co., Inc., stores of the classes of fabrics desired for this study, agreed to purchase for the AATCC Wash Committee about 40 five yard samples of fabrics he believes suitable for the intended survey.

About one-half of these fabrics have been secured and the work of washing them to show the desired degrees of color change will be started in the near future.

The selected fabrics will include men's shirts and shorts, pajamas, and washable women's and children's clothing for different uses.

The Chairman of the AATCC Committee on Fastness to Washing, with the aid of committee members, has about 80% completed, reports on the work of the Cotton Division during the past 3 years and of the Synthetic Fibers Division. It is planned to have them published in an early future issue of the American Dyestuff Reporter and to distribute copies to all to whom a copy of this memorandum is being sent.

CHARLES A. SEIBERT, *Chairman.*

Tests of Snag Resistance

The first meeting of the Committee on Tests of Snag Resistance was held at 11:00 A.M., April 1, 1948 at the Hotel Pennsylvania, New York City.

The primary interest of this committee is the problem of snagging of women's hosiery. The snag resistance of hosiery is concerned with obtaining:

(1) a high percentage of first quality in mill handling.

(2) satisfactory consumer use with laundering.

The problems which the committee feel relate to its interests are:

(1) evaluation of existing methods of measuring snag resistance.

(2) study of factors contributing to snagging.

(3) methods of overcoming snagging.

The interests of this committee overlap those of Sub-Committee A-12, Committee D-13 of the ASTM. Four members of the AATCC Committee are also active members of the ASTM Committee. The Chairman of the AATCC Committee is a member of the ASTM Committee and vice-versa.

Subcommittee A-12, D-13 of ASTM already has an organized program on evaluating existing snag testers. After polling its members, the ASTM Committee has decided to study first, the sand paper type tester described in an article entitled "A Simple Tester for Evaluating the Snag Resistance of Nylon Hosiery" by J. Edward Smith and Thomas D. Johnson, Jr. which appeared in the March 22nd issue of the American Dyestuff Reporter. The study is to include an interlaboratory comparison to determine the duplicability of this method in the hands of different operators.

The AATCC Committee on Tests of Snag Resistance has made the following decisions:

(1) We shall in every way cooperate with the ASTM Committee in their program to avoid duplication of tests and to increase the effectiveness of all our work.

(2) The evaluation of the currently existing test methods and equipment will be left to the ASTM Subcommittee A-12 of D-13. The results from the ASTM work on Tests of Snag Resistance will be supplied in retail to the members of the corresponding AATCC Committee.

(3) The AATCC Committee intends to undertake a study of factors relating directly to snag control. These factors may include:

(a) internal friction in the fabric.

(b) flexibility and stiffness of the fabric.

(c) adhesion properties of the fabric and finish.

(d) film forming properties of finishes.

(e) static electricity.

(f) hygroscopicity.

(g) construction details.

All studies of factors relating to snagging should utilize the snag resistance tester found best by the ASTM as a reference standard. The studies should also include the use of abrasion testing, wear testing and other such tests whenever found practical. The impression of experienced hands in judging hosiery finishes for snag resistance should not be overlooked.

This committee is making no specific recommendations such as detailed finishing procedures and particularly no recommendation of individual products for overcoming snagging in hosiery. It is believed

that a study of the factors relating to snagging should be of value in pointing the way towards improved handling of problems of snag control in ways most suitable in individual plants.

J. E. SMITH, *Chairman.*

Perspiration

The Meeting of the above Committee was held Thursday, April 1, 1948 at 4 P.M. at the Pennsylvania Hotel, N. Y. C.

Those present were:—*Chairman*—Mr. John Dalton; Matthew J. Babey, Elmer A. McCabe, Henry E. Millson, Wendall C. Lever, Walter Stump, C. H. A. Schmitt.

Guests: Frank E. Fleming, George J. Greendonner, William J. Barnes.

Mr. Christison sent a letter regretting his inability to attend the meeting but indicated his interest, and that his laboratory will continute to carry out tests.

Mr. Dalton read a letter from Charles L. Simon of Industrial By-Products & Research Company. This is as follows:—

"Thank you for your letter of Feburard 2nd, in the matter of AATCC tests on fastness to perspiration.

One of the things which past tests have not seemed to evaluate is the change of color of the test specimen itself, although they have done a fair job for determining the tendency to stain light colored materials.

Some years ago, an examination by actual complaints of men's white shirts which had been stained by linings when the wearer was caught in the rain, as well as other light colored materials stained by perspiration, showed that it was desirable to have a test in which the component dyestuffs could exercise their inherent tendencies to be absorbed selectively and to produce bands of staining in which the dyestuff with the greatest ability to be absorbed would leave a band farthest from the specimen under test, etc. I am wondering whether your Committee is taking this matter into consideration."

As indicated in the notice to the members, we followed our previous plans and discussed the need for coming to a conclusion on:—

1—The adoption of the plate method.

2—A decision on the matter of common salt in the solutions.

3—Type of test fabric to be used.

4—Amount of pressure.

5—The question of the adjustment of the pH of the dyed fabric before testing. Tests suggested for our appraisal by the Society of Dyers and Colorists in England).

1—THE ADOPTION OF THE PLATE METHOD.—Early meetings and a review of tests by various laboratories indicated that the plate method with a 9-10 lb. pressure gave a similar degree of shade change and staining of white fibers as is obtained in the older tube method. However, the plate method produces a definitely uniform staining over the entire white fabric against the irregular and mottly staining in the tube test. Furthermore, the plate method is much simpler to handle and offers a far greater degree of duplication either by the same or different operators under different conditions. The question of the adoption of the plate method was put before the Committee and was voted unanimously.

2—A DECISION ON THE MATTER OF COMMON SALT IN THE SOLUTIONS.—From tests that have been carried out by the different laboratories, the majority of those present saw no need for changing the formula of the two solutions. Mr. Schmitt reported that on the cotton or viscose fabrics or on those mixed fabrics dyed with direct colors, he had noted one or two minor variations when salt was eliminated. To remove the salt from our test solutions would increase the severity of the test, and as other members pointed out—this might rule out a number of presently used dyestuffs.

Another member of the Committee, Paul Duggan of the Celanese Corp., was unable to be present but wrote a letter bearing particularly on this subject. This is as follows:—

"The recent series of perspiration tests, run in our laboratory, brings us to the conclusion that the absence of salt in the test solutions results in a slight increase in bleeding and a slight increase in the staining of the test fibers".

As the differences are so minor, the Committee voted to continue the use of the present solutions containing common salt.

3—TYPE OF TEST FABRIC TO BE USED.—Messrs. Millson and Babey displayed a large series of tests checking on the decision made at the last meeting that —"It was decided that a flat white fabric should be used in making the tests instead of using fabrics containing floats or raised fibers. Using the latter fabrics containing floats an uneven pressure is developed, producing mottly staining of the white fabric." It was voted to adopt the new six fiber fabric of the AATCC which contains ¼" strips of cotton, viscose, silk, nylon, acetate and wool.

4—AMOUNT OF PRESSURE.—After considerable discussion it was voted to adopt a pressure of 10 lbs. The question of how this pressure is to be applied and regulated is still under consideration. The AATCC Research Dept. at Lowell Textile Institute has a Perspirometer built along the lines of our original drawing with a screw device measuring the degree of pressure. However, this screw device is not considered too accurate and the Calco Chemical Company have been working on a more accurate method. We also learned that the Mico Company in Cambridge, Mass. who built the first commercial model of the Perspirometer, have a new idea for applying and registering the pressure. It was agreed to ask the Research Committee to have another model made using this newest metering device.

5.—THE QUESTION OF THE ADJUSTMENT OF THE pH OF THE DYED FABRIC BEFORE TESTING.—All members of the Committee agreed that the test as suggested was not practical. Mr. McCabe of Forstmann displayed a number of tests which gave similar results as obtained by other members of the Committee. It was found very difficult to neutralize the pieces and bring them up to a pH of 7, particularly with Acid Colors. These colors bleed so much in the sodium acetate solutions that it automatically produces an artificial alteration of the shade. Mr. Dalton will write the SDC of our objections to the method.

Other Subjects Discussed and Action Taken

ALTERATION OF SHADE.—The question of shade alteration as mentioned in Mr. Simon's letter was thoroughly discussed and all agreed that this point is really of more consequence than the staining of white fibers. Shade change is considered in the fastness ratings tabulated in the present Year Book, but perhaps more importance should be given to this matter in tabulating ratings. It was agreed to adopt the Color Transference Chart as a means of rating the staining of white fibers. It was also agreed to use figures from 5 down to 1 for registering fastness rather than the 4-0 as in the past, thereby conforming to the usual ratings employed by dyestuff companies in all their fastness tables.

Mr. Lever reported on his work on the possible variations required in the test for pile or upholstery fabrics. He has been working with the American Car Seating Company. His work indicates that the plate method can be satisfactorily used with the exception that only the white test cloth is impregnated with the perspiration solutions thereby simulating what actually takes place in every day use. Mr. Lever states that the plate test run for 6 hours at 100° F. produces the same results as the American Car Seating Company

test. The question was then raised that perhaps our regular test is possibly being conducted improperly and that perhaps we should subject the dry dyed fabric to contact with the wet white fabric. In actual use or in the wearing of garments, a dry lining or outer garment comes in contact with white under clothing which itself is wet with perspiration. It was agreed that we should carry out tests along these lines.

Further Work to be Done Before the Next Meeting

A.—Different members of the Committee will carry out tests following Mr. Lever's idea of only wetitng the white test fabric. If the same degree of color change in the staining of white fabrics takes place under this test as our former method of wetting both the white and dyed materials, a further simplification of our test methods would result.

B.—There was some discussion as to whether or not we require 18 hours for our tests inasmuch as most staining occurs in the first few hours. The opinion was expressed that colors which stand the 6 hour test are generally entirely satisfactory in actual use. Members of the Committee ar requested to carry out further tests at 100° F. for different periods of time from one hour up. It was also suggested that accumulative tests should be run. Assuming a color passes the 18 hour test, would it stand a second and third 18 hour test? If a breakdown does occur after the third test could this be accomplished by running three six hour tests?

Summary

With a few exceptions most matters under consideration have been brought to a satisfactory conclusion and the Committee hopes that by the next meeting we will be ready to draft a change in the specifications and offer a tentative fastness method to the Research Committee for adoption.

C. H. A. SCHMITT, *Secretary.*

Fastness to Light

The Committee can, at the present time, only report progress on the three active projects with which it is concerned. These projects and their current status are:

1. Regarding the preparation by the National Bureau of Standards of the previously approved blue calibration paper A, we are informed that most of the Bureau's difficulties have been ironed out, and that a supply of the papers and standard exposures should be available in the latter part of this month. It is intended by the Bureau to use a beater dyed paper instead of the calendar stained paper previously used. This will of course require testing by Committee members to ensure equal performance with the previous papers.

2. Under the direction of our Secretary, Mr. Seibert, Atlas is making exposures of vat dyed cotton piece goods in an Atlas Twin Arc Weatherometer, for comparison with already completed exposures in the National Carbon Accelerated Weathering Unit. This work is intended to indicate the comparison in fading rate and quality between the two units, and it is planned to extend it in the future to cover a large range of dyes used for textile materials designed for outdoor use.

3. Preliminary correspondence has been entered into with the General Electric Company, following initial negotiations by our Association President, Henry Herrmann, relating to their proposed investigation into the possibility of applying a photoelectric integrating exposure meter, known as the Totalux, to the problem of accurately measuring the fading radiation in the Fadeometer. If this can be done successfully, the necessity for using calibration papers will be eliminated. This work, however, is still in the exploratory experimental stages, and no report is possible at this time.

W. A. HOLST, *Chairman.*

Ageing of Textiles

Report of meeting held at the Hotel Pennsylvania, New York City, 4 to 6 p.m., April 1, 1948.

Present: W. D. Appel, National Bureau of Standards.

K. S. Campbell, National Bureau of Standards.

K. H. Barnard, American Cyanamid Company.

W. H. Cady, U. S. Finishing Company.

J. D. Dean, Chairman, Southern Regional Research Laboratory.

P. J. Fynn, Southern Regional Research Laboratory.

Julian Maas, Brooklyn Naval Clothing Depot.

Dr. A. R. Macormac, Philadelphia Quartermaster Depot.

Dr. J. Fred Oesterling, Philadelphia Quartermaster Depot.

The agenda for the meeting included: (A) Review and discussion of current work on weathering, ageing, and light deterioration of textiles; (B) Expression of opinions based upon members' experience with the carbon arc-water spray accelerated weathering unit in regard to the utility of this instrument as a means of evaluating textiles and finishes for end uses; (C) Consideration of adopting the special cotton, acetate, and nylon tapes, selected by the Quartermaster Corps for weather exposure investigations, as basic testing materials in this Committee's work.

A. (WEATHERING, ETC.).—Since the term "ageing" is a rather broad one nd is subject to various interpretations, it was suggested by the Chairman that an attempt be made to define it in the sense that will be understood and employed by this Committee. It was the Chairman's opinion that in establishing laboratory ageing procedures the term "accelerated" is generally implied. Such testing methods should be designed to cover the performance of textiles when exposed to the destructive action of weather, as well as when they are stored or used under unfavorable conditions. It is clear, however, that resistance to mildew cannot well be included in the usual ageing tests, even though this destructive factor is recognized to be a part of the natural weathering process. Methods of measuring mildew resistance of textiles have been set up by another committee, and it is believed that tests for this property will have to be made separately.

In a general discussion of ageing, it appeared to be the prevailing opinion that work on weathering deterioration of textiles, using cotton as a standard reference material, could be most profitably pursued by this Committee. Fundamental work of this type will embrace the establishing of weather degradation patterns based upon the relationships observed in strength-fluidity or other significant criteria, and in the correlation of weathering patterns obtained in one locality with those from others. Results secured by the Quartermaster Corps from the proposed extensive weathering exposure tests of identical textiles in widely differing localities will be of great importance in this connection. Attention will also be given to establishing informative storage tests by those especially interested in this problem, and information secured in such investigations will be made generally available. It was pointed out by Dr. Oesterling that the Quartermaster Corps is particularly concerned with the behavior of textiles and finishes during storage, but that development of accelerated storage tests must depend upon results observed in actual field tests. To some extent the oxygen bomb and ultraviolet light are being used in this type of accelerated testing.

From the above discussion the conclusion was reached that for the general purpose of this Committee ageing of textiles may be considered to embrace establishment of testing procedures, preferably

short-term in nature, that may serve to evaluate or predict the performance of textiles and finishes under long-term detrimental conditions of use or storage. It is not necessary that the testing methods attempted to reproduce or simulate the exact action of degrading agencies, but they should produce effects upon which dependable estimates of service performance may be based.

An examination of the effect of light on various textile fibers is being conducted at the Southern Regional Laboratory. Yarns representing a wide range of fibers, both natural and synthetic, are mounted parallel on light wooden frames and are exposed to sunlight, to light from artificial sources, and to full weather. In all exposures a standard cotton yarn is being used as a control. This work is not sufficiently advanced to permit even a preliminary report at present. A review made of the literature appearing during the last 20 years in the field of light deterioration of textiles is being pepared for publication.

B. (ACCELERATED WEATHERING UNITS).—It developed that only two laboratories represented in this group, the National Bureau of Standards and the Southern Regional Research Laboratory, are working extensively with the carbon arc-water spray device as a means of predicting the action of sun and rain on textiles, cotton being used as a standard material at both institutions. Extensive alterations have been made in the weathering units to permit sloser control of radiation, temperature, and moisture conditions under which samples are exposed, in the attempt to secure results that correlate more nearly with those of natural weather. A considerable improvement in uniformity of the degradation observed in the exposed samples resulted from these alterations, but since both laboratories to date have worked chiefly with untreated cotton fabrics no conclusions have yet been reached on the utility of these units for the evaluation of finished cotton and non-cotton textiles for end uses. It was suggested by Mr. Appel that in work with this instrument strength and fluidity changes in cotton preferably should be measured against recorded incident energy received by the samples, rather than against hours of exposure.

C. (Q. M. C. TAPES).—Consideration was given to the use of the special Quartermaster Corps tapes for committee work. It was explained by Dr. Oesterling that these tapes are to be exposed to weather at several localities possessing widely different climatic conditions, and will thus give information about the effects of diverse types of weathering on three different fibers, data which should be useful for correlation with accelerated tests. In the interest of having a common or standard test material for weathering and ageing work, three laboratories in addition to the Philadelphia Quartermaster Depot expressed the intention of securing a supply of these tapes.

It was agreed that there would be close cooperation and exchange of information and suggestions between committee members in all of the work contemplated. The meeting was adjourned at 6:00 p.m.

J. D. DEAN, *Chairman.*

Fiber Mixtures

The committee is at present working on two methods for the determination of nylon in blends, (1) the formic acid method and (2) the 1:1 hydrochloric acid method. Both of these reagents have been used with good results in the analysis of blends containing nylon. After comparison of these methods and working out details of procedure, one of them may be recommended for the year book.

Published work on the use of various concentrations of sulfuric acid in fiber analysis indicates the possibility of a simplification of the AATCC 70% sulfuric acid method. This method is now carried out in two steps, first a treatment with boiling 1% sulfuric acid followed by a treatment with 70% sulfuric acid at 100° F. The committee plans to do further work on this method to determine if it may be carried out in a single operation at room temperature.

The analysis of blends of wool and manufactured protein fibers. The committee has worked on this problem using blends of wool and casein fiber. It is our understanding that casein fiber is no longer being manufactured in this country. The committee therefore plans to continue this work using blends of wool and the manufactured vegetable protein fibers, soya bean and peanut.

LESLIE CHRISTISON, *Chairman.*

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Meeting, New York Section

THE final meeting of the New York Section for the 1947-48 season was held on May 7th at Kohler's Swiss Chalet, Rochelle Park, N. J. An informal dinner preceded the meeting.

Dr. Herman E. Hager, Chairman, referred to the outing to be held on June 25th at the North Jersey Country Club and also to the formation of the Western New England Section which has been assigned a portion of the territory formerly covered by the New York Section.

Kenneth Barnard, National Convention Chairman, spoke briefly about the Augusta convention, scheduled for October 21-23, and urged members to make early reservations for the special train from the north.

Patrick J. Kennedy, Chairman of the Nominating Committee, submitted the following slate of officers for one year beginning August 1st:

Chairman—Charles W. Dorn, J. C. Penney Co.

Vice-Chairman—Paul J. Luck, Calco Chemical Division, American Cyanamid Co.

Treasurer—John H. Hennessey, General Dyestuff Corp.

Secretary—Norman A. Johnson, American Dyestuff Reporter.

These officers were unanimously elected.

Norman A. Johnson, Secretary, reported that reports of all meetings had been published.

John H. Hennessey, Treasurer, reported a balance on May 1, 1948 of $1,240.18 compared to $1,374.78 on September 1, 1947. He reported a total attendance of 1,211 during the 1947-48 season.

Clark A. Heydon, Chairman of the Membership Committee, reported a slight gain in total membership during the past season in spite of the loss of members to the Western New England Section.

Felix L. Bume, Chairman of the Corporate Membership Committee, reported that during the coming months the committee would become active in soliciting additional members.

The speaker of the evening was G. T. Hug of the Technical Laboratory of E. I. duPont de Nemours & Co., Inc. who spoke on "The Dyeing of Woolen Fibers and Fabrics with Vat Colors".

The attendance was about 250.

Respectfully submitted,
Norman A. Johnson, *Secretary.*

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Visit AATCC Headquarters

RECENT visitors to AATCC headquarters at Lowell Textile Institute were: G. B. Angus, Director, John Crossley & Sons, Ltd., Dean Clough Mills, Halifax, England, and H. H. Bowen, Chief Chemist for the Bradford Dyeing Association in England.

Mr. Bowen, together with William H. Cady who is working on the Colour Index for the AATCC, were guests of Dr. Olney. Dr. H. C. Chapin, National Secretary, and Dr. Harold W. Stiegler, Director of Research, joined the group in a discussion of problems of mutual interest.

Outing, Western New England Section

THE first annual outing of the Western New England Section will be held on June 18th at the Wallingford Country Club, Wallingford, Connecticut. Activities are scheduled to start at 10:30 A.M. and dinner will be served at 7:30 P.M.

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Meeting of the Piedmont Section

THE spring meeting of the Piedmont Section was held on April 3rd, 1948, in the Robert E. Lee Hotel, Winston-Salem, N. C., with Charles B. Ordway serving as chairman, and about 250 attending. The program on Saturday afternoon was divided into two sessions, one on Hosiery, and the other on Cotton Finishing.

At the Hosiery Session, Robert H. Smith of the High Point Chemical Manufacturing Co. presided. The speakers were J. C. Whitt of the Century Hosiery Mills, on "Dyeing Vat Colors on Men's Half Hose," and Rufus K. Smith of the Owen-Osborne Hosiery Mills, on "Nylon Hosiery Preparation and Dyeing".

At the Cotton Finishing Session, P. E. Smith of Riegel Textile Corporation presided. The speakers were R. M. Fischer of the American Cyanamid and Chemical Corporation, on "Resins Improve Good Fabrics," and Raymond A. Pingree of the Warwick Chemical Division, Sun Chemical Co., on "Water Resistant Fabric Treatments".

Under direction of Howard Virkler and William Livingston, a golf tournament was held on Saturday morning. At the evening banquet Charles Carvin of New York was the speaker.

Respectfully submitted,
R. H. Smith, *Secretary.*

Technical Papers Presented at Local Section Meetings Should Be Sent to the National Secretary

Lapel Buttons for AATCC Members

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These buttons bear the seal of the Association and may be purchased by members in good standing from the National Secretary at $2.00 each.

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CALENDAR

PHILADELPHIA SECTION
Meetings: September 24, November 12, January 28, 1949 (Kugler's, Philadelphia).

NEW YORK SECTION
Outing: June 25 (North Jersey Country Club).

PIEDMONT SECTION
Outing: June 18 and 19 (Ocean Forest Hotel, Myrtle Beach, S. C.).

NORTHERN NEW ENGLAND SECTION
Meetings: September 24 (Andover Country Club); November 19.

SOUTHEASTERN SECTION
Meetings: July 24 (Atlanta, Ga.); September 25 (Columbus, Ga.); December 4 (Atlanta, Ga.).

WESTERN NEW ENGLAND SECTION
Outing: June 18 (Wallingford Country Club, Wallingford, Conn.).

SUB-COMMITTEES
Meeting: September 16 (New York).

COUNCIL
Meeting: September 17 (New York).

RESEARCH COMMITTEE
Meeting: September 17 (New York).

NATIONAL CONVENTION
October 21-23 (Sheraton Bon Air Hotel, Augusta, Ga.).

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EMPLOYMENT REGISTER

This column is open for four insertions per year, per member, without charge. Blanks can be obtained from, and filed with, the Secretary of the Association, Lowell Textile Institute, Lowell, Mass. It is understood that these will be open to inspection by prospective employers, who can obtain further information from the Secretary.

48-1

Education: B.S. Rhode Island State College.
Experience: Chemist, print works.
Age 33; married; references; position in New England desired.

48-6

Education: B.A. University of Pennsylvania, with graduate study.
Experience: Fifteen years, wool scouring, carbonizing, bleaching; synthesis of wetting agents, detergents, textile oils and sizes; shrink proofing, waterproofing, mildew proofing.
Age 36; married.

48-7

Education: Technical school, with additional college courses.
Experience: Textile chemist, with practical experience in dyeing and finishing of cotton and rayon, including resin finishes. Textile Technologist, U. S. Quartermaster Corps, during war. Good knowledge of Spanish and Portugese.
Age 26; married; references; will work anywhere.

48-8

Education: B.A., New York University.
Experience: 19 years, textile chemical laboratory.
Age 39; married; references; vicinity of New York City preferred.

All Correspondence Concerning the Employment Register Should Be Directed to the National Secretary

The Quantitative Analysis of Synthetic Detergents

Extension of Igepon T Method to Various Agents Containing the Sulfonic Acid Group

DMITRY A. SHIRAEFF
General Dyestuff Corporation

IN an article giving a method for the quantitative analysis of Igepon T[1], it was stated that it might be possible to extend it to include others of the large group of wetting-out agents and detergents.

The reaction involved is not specific only for Igepon T (a sodium salt of oleylmethyl-tauride) but is essentially a reaction between a sulfonic acid and an organic amine, resulting in the formation of a water insoluble salt.

Many of the present day synthetic scouring and wetting-out agents are sulfonic acids of fatty acid condensates, as Igepons, or sulfonated fatty alcohols, or aryl sulfonates. All of them, as far as they may be considered sulfonic acid derivatives, can be analyzed by the method developed for Igepon T. For each class of such detergents there may be necessary some modification, slight or more extensive, depending upon the specific properties of the individual compound under analysis. But it is possible to give a general set of conditions which if all present, should allow a successful application of the Igepon T method. They are:

1. Presence of the sulfonic acid group.
2. Formation of a water insoluble salt with a weak organic amine such as benzidine.
3. The salt formed in (2) should be—
   (a) crystalline and easily filterable
   (b) soluble in some neutral organic solvent.
4. The amine used should be not so strongly basic as to turn phenolphthalein indicator red.

The purpose of this paper is not to give detailed procedures for all compounds which we are able to analyze by modifying the basic method for Igepon T, but to call to the attention of the analytical chemist its possibilities.

First of all, the method can successfully be used for routine analysis of the strength of a number of commercial synthetic detergents which are purchased at present more or less on faith. It can be used for assaying mixtures of these detergents with soap. It opens possibilities for research work in studying textile processes involving the use of synthetic detergents where it is desired, for instance, to determine their substantivity to various fibers, or their concentration in standing baths.

This method, though a quantitative one, can also be used to differentiate qualitatively among various detergents, as a simple mathematical treatment of the data obtained from the analysis leads to calculation of the approximate molecular weight.

In order to develop this point it would be helpful to repeat in outline the procedure for Igepon T analysis and restate the data given in the original paper *(1)*.

Outline of the Procedure

A sample of Igepon T is weighed and dissolved in water. Hydrochloric acid is added, followed by addition of a solution of benzidine hydrochloride, whereupon the Igepon T precipitates as its benzidine salt. This salt is filtered off, washed with water, dried, freed of soap with petrolic ether, and dissolved in alcohol to separate it from inorganic sulfates. An aliquot portion of the alcoholic solution is titrated with caustic soda, and another aliquot portion evaporated to dryness and brought to constant weight.

Data obtained are given in Tables I and II.

The percentage of Igepon T was calculated from the data of Table I by using the formula:

$$\frac{\text{c.c. NaOH used} \times \text{Normality} \times 425.5}{\text{Weight of sample taken for titration}} \times 100 = \% \text{ Igepon T}$$

Where 425.5 is the molecular weight of Igepon T.

In the case of the alternate method which is represented in Table II when, instead of titrating, we evaporated to dryness a portion of the alcohol solution of the benzidine salt of Igepon T, the cal-

TABLE I[1]

Sample	Wt. of sample taken for the analysis	Wt. of sample taken for the titration	NaOH Titration cc of 0.0203N used	NaOH Titration cc of Normal calculated	Igepon T Found Weight	Igepon T Found %
A	2.000 gms.	1.000 gms.	16.15 cc	0.328 cc	0.1396 gm.	13.96%
B	2.000 gms.	1.000 gms.	16.25 cc	0.330 cc	0.1404 gm.	14.04%
C	2.000 gms.	1.000 gms.	16.15 cc	0.328 cc	0.1396 gm.	13.96%
D	2.000 gms.	1.000 gms.	16.30 cc	0.331 cc	0.1408 gm.	14.08%
	Mean of the four determinations			0.329 cc	0.1401 gm.	14.01%

TABLE II[1]

Sample	Wt. of sample taken for the analysis	Wt. of the dried precipitate	Factor of Igepon T over the precipitate	Igepon T Found Weight	Igepon T Found %
A	0.500 gm.	0.0816 gm.	0.8586	0.07006 gm.	14.01%
B	0.500 gm.	0.0820 gm.	0.8586	0.07041 gm.	14.08%
C	0.500 gm.	0.0816 gm.	0.8586	0.07006 gm.	14.01%
D	0.500 gm.	0.0825 gm.	0.8586	0.07083 gm.	14.17%
	Mean of the four determinations	0.0819 gm.		0.07034 gm.	14.07%

culation of the Igepon T percentage was accomplished by use of the equation:

$$\frac{\text{Weight of Benzidine Salt of Igepon T} \times 0.8586}{\text{Weight of sample in the aliquot portion}} \times 100 = \%\ \text{Igepon T}$$

where:

$$0.8586 = \frac{2(\text{Molecular Weight of Igepon T})}{\text{Molecular Weight of Benzidine Salt of Igepon T}}$$

Both of the above equations involve the molecular weight of Igepon T. Consequently they limit the method to the originally intended purpose of a strictly quantitative analysis of samples known to contain various concentrations of Igepon T.

By substituting molecular weights of other synthetic detergents which give insoluble salts with benzidine hydrochloride, such as Gardinol or Cyclopon, the method can be extended to again strictly quantitative methods for essentially pure samples of these particular compounds.

Analysis of mixtures of such detergents would lead to false answers. In this form the method would exclude completely analysis of aryl sulfonates whose molecular weight are unknown and varying, depending on the raw materials from which they are synthesized.

In order to extend the Igepon T method to include the numerous compounds which can be analyzed by this method, and to add *qualitative* functions to it, the calculations involved in the method should be freed from dependence on the molecular weight of the compound under analysis.

This can be done by considering the mechanics of the reactions involved and the mathematical solutions of the chemical equations which express these reactions.

We stated before that Igepon T is a sodium salt of oleyl-methyl-tauride,

$$C_{17}H_{33}CON(CH_3)-CH_2-CH_2SO_3Na$$

When Igepon T is precipitated with benzidine hydrochloride, the reaction is: Igepon T + Benzidine Hydrochloride → Benzidine Salt of Igepon T + 2NaCL.

When the benzidine salt of Igepon T is titrated with caustic soda, the molecular reaction is: Benzidine Salt of Igepon T + 2NaOH → Benzidine Base + 2 Igepon T + $2H_2O$.

Expressing this reaction as an equation we shall have:

Weight of Igepon T = Weight of NaOH used in Titration + Weight of Benzidine Salt of Igepon T — Weight of Benzidine Base liberated — weight of water formed.

The above equation can be restated in this form:

$$\text{Weight of Igepon T} = \frac{\text{cc of NaOH} \times \text{Normality}}{1000} + \text{Weight of Benzidine Salt of Igepon T} - \frac{\text{cc of NaOH} \times \text{Normality} \times \tfrac{1}{2}\ \text{Molecular Weight of Benzidine Base}}{1000} - \frac{\text{cc of NaOH} \times \text{Normality} \times \text{Molecular Weight of water}}{1000}$$

Simplifying this equation and substituting the molecular weights of caustic soda, benzidine base, and water, we obtain:

$$\text{Weight of Igepon T} = \text{Weight of Benzidine Salt of Igepon T} - \left(\frac{\text{cc of NaOH} \times \text{Normality}}{1000} \times \frac{40 - 184.11 - 18}{2}\right)$$

and by solving this equation —

$$\text{Weight of Igepon T} = \text{Weight of Benzidine Salt of Igepon T} - \left(\frac{\text{cc of NaOH} \times \text{Normality}}{1000} \times \frac{40 - \frac{184.11}{2} - 18}{1}\right)$$

$$= \text{Weight of Benzidine Salt of Igepon T} - \left(\frac{\text{cc of NaOH} \times \text{Normality}}{1000} \times \frac{22 - \frac{184.11}{2}}{1}\right)$$

$$= \text{Weight of Benzidine Salt of Igepon T} - \left(\frac{\text{cc of NaOH} \times \text{Normality}}{1000} \times \frac{22 - \frac{184.11}{2}}{1000}\right)$$

$$= \text{Weight of Benzidine Salt of Igepon T} - 0.07 \times \text{cc. of NaOH} \times \text{Normality}$$

Reverting now to the data previously cited we see that in Table I, we used 0.329 cc. of normal caustic soda for the titration of an aliquot representing one gram of Igepon T; and that in Table II, the weight of the precipitated benzidine salt of Igepon T was 0.0819 gm. from an aliquot of one half a gram of the original sample.

Substituting these values in our last equation, we obtain:

Weight of Igepon T = Weight of Benzidine Salt of Igepon T — 0.07 x cc. NaOH x Normality.

Weight of Igepon T = 0.0819 x 2 — 0.07 x 0.329 x 1 = 0.1408 gm.

And since this is for one gram of the original sample, the Igepon T content of the sample is the same 14.08% as we arrived at by the previous method of calculation.

The important difference is, however, that we arrived at this figure without using the molecular weight of Igepon T.

This fact becomes an important reserve trump in the hands of the analyst. The strictly quantitative method is enhanced in this way with qualitative functions.

Had we not known that we were analyzing a sample of Igepon T, we could deduce so from the very data of the analysis itself. Using a well known basic chemical relation that:—

$$\frac{\text{Weight}}{\text{Molecular Weight}} = \text{Moles},$$

we can calculate the approximate molecular weight of the substance under the analysis. Thus:

$$\frac{0.1408}{\text{Molecular Weight}} = \frac{0.329}{1000}$$

$$\text{Molecular Weight} = \frac{0.1408 \times 1000}{329} = 427.9$$

which differs but slightly from the actual molecular weight of Igepon T which is 425.5.

For the sake of further elucidation of this point, we are giving below data obtained from the analysis of another brand of our synthetic detergents, Cyclopon A Extra.

Cyclopon is a first cousin of Igepon T, instead of oleyl-methyl-tauride, it is palmityl-methyl-tauride

$$C_{15}H_{31}CON(CH_3)-CH_2-CH_2SO_3Na$$

The procedure for the analysis of this compound is very much the same as for Igepon T, but due to a rather large amount of inorganic sulfates present in this brand, we used the double quantity of benzidine hydrochloride reagent, and for the dissolving of the precipitated benzidine salt of Cyclopon, we took 250 cc. of straight alcohol instead of a 100 cc. mixture of 80 parts of alcohol and 20 parts of water as in the case of Igepon T analysis.

Analysis of a Commercial Sample of Cyclopon A Extra

2.0000 gms. of an oven dried sample of Cyclopon A Extra were taken for analysis. The precipitated Benzidine Salt of Cyclopon, after filtering it off, washing, and purifying, was dissolved in 250.0 cc.

TABLE III

Sample	Weight of the sample taken for the titration and for the evaporation	cc of 0.0205 N NaOH used in Titrations	Weight of the Benzidine Salt of Cyclopon obtained by evaporation
A	0.8000 gm.	15.9 cc	0.1525 gm.
B	0.8000 gm.	16.0 cc	0.1540 gm.
C	0.8000 gm.	15.8 cc	0.1533 gm.
D	0.8000 gm.	16.0 cc	0.1546 gm.
Mean of the four determinations		15.93 cc	0.1536 gm.

TABLE IV

Sample	Weight of the oven dry sample taken for the analysis	Weight of sample taken for the titration	Caustic Soda Titration cc of 0.0203 N used	Caustic Soda Titration cc of Normal calculated
A	0.9795 gm.	0.3918 gm.	18.1 cc	0.367 cc
B	0.9795 gm.	0.3918 gm.	18.0 cc	0.365 cc
C	0.9795 gm.	0.3918 gm.	18.4 cc	0.374 cc
Mean of the three determinations				0.369 cc

alcohol. A 100.0 cc. aliquot of this solution was taken for the titration with caustic soda and 100.0 cc. aliquot was taken for the evaporation. (See Table III).

Substituting in the formula:—

Weight of Cyclopon = Weight of Benzidine Salt of Cyclopon — 0.07 x cc. NaOH Normality, the values of the mean determinations from Table III we obtain: Weight of Cyclopon = 0.1536 — 0.07 x 15.93 x 0.0205 = 0.1307 gm.

Dividing this figure by the weight of the sample it represents, and multiplying by 100, we find that our sample of Cyclopon A Extra contains:—

$$\frac{0.1307}{0.8000} = 16.34\%$$ of pure palmityl-methyl-tauride

And here again, had we not known that the active ingredient of our Cyclopon A Extra is palmityl-methyl-tauride, we could have verified this by calculating the approximate molecular weight of the sample which we analyzed using the formula:

$$\frac{\text{Weight}}{\text{Molecular weight}} = \text{Moles}$$

Thus, in this case we would find:

$$\frac{0.1307}{\text{Molecular Weight of Sample}} = \frac{15.93 \times 0.0205}{1000}$$

$$\text{Molecular Weight of Sample} = \frac{0.1307 \times 1000}{15.93 \times 0.0205} = 400.2$$

and the actual molecular weight of palmityl-methyl-tauride is 399.4

The Igepon T method for the analysis of synthetic detergents is of a special interest in application to the class of detergents known under a general name of alkyl-aryl-sulfonates.

These are essentially sulfonated aromatic hydrocarbons with side chains consisting of aliphatic hydrocarbons. The length of the side chain and the type of the aromatic ring determine the presence or absence of certain desirable or certain objectionable properties which these compounds possess.

The syntheses of these compounds are several, but the object of any is attachment of a desired aliphatic hydrocarbon chain to an aromatic nucleus. In any case, the source of the aliphatic hydrocarbons is a petrolic fraction distillate. The resulting products, therefore, are mixtures of homologues and not single individual chemical compounds.

In the better brands of these detergents, the molecular weights of the individual members of the mixture do not differ too widely, and the proportion of the highest and lowest molecular weight homologues present in the mixture is kept to a minimum. The term molecular, when applied to any of these detergents, connotes the average of the molecular weights of the homologues and it is numerically approximate and variable from lot to lot.

The absence of a definite molecular weight bars ordinarily the application to these detergents of analytical methods based on stoichiometric relations.

The Igepon T method overcomes this difficulty and allows for the first time a direct and independent analysis of these detergents without recourse to any predetermined reference standards as was the case in the methods previously published.

The concurrent determinations on the same sample of the weight of the benzidine salt of the alkyl-aryl-sulfonate and the titration of the sulfonic acid group present in this salt allows the complete elimination of the molecular weight of the alkyl-aryl-sulfonate from the stoichiometric calculations involved as it was demonstrated on the examples of Igepon T and Cyclopon A Extra analyses.

Below we are giving an example of a typical analysis run in our laboratory on a comercial sample of an alkyl-aryl-sulfonate.

Procedure

The procedure in this case is exactly the same as for Igepon T given in details in our original article *(1)*, with the exception that straight alcohol was used where a mixture of 80 parts of alcohol and 20 parts of water was used in the Igepon T analysis.

Analysis of a Commercial Sample of a Detergent of the Alkyl-Aryl-Sulfonate Type

1.0000 gm. sample of the detergent was weighed out and dissolved in water. The active ingredient of the sample was precipitated with benzidine hydrochloride. The precipitated benzidine salt of the detergent was filtered off, washed, freed from unsulfonated matter by washing with petrolic ether, and separated from the inorganic sulfates by dissolving it with alcohol. The alcoholic solution was brought to exactly 100.0 cc. and 40.0 cc. of this solution were taken for the titration (Table IV) and 40.0 cc. were evaporated, dried to constant weight, and weighed (Table V). By a separate determination it was found that the original sample contained 2.06% moisture.

TABLE V

Sample	Weight of the oven dry sample taken for the analysis	Weight of sample taken for the evaporation	Weight of the Benzidine Salt of the Detergent
A	0.9795 gm.	0.3918 gm.	0.1582 gm.
B	0.9795 gm.	0.3918 gm.	0.1571 gm.
C	0.9795 gm.	0.3918 gm.	0.1599 gm.

TABLE VI (Calculations)

Sample	Weight of the sample in the aliquotes taken for the titration and the evaporation	cc of Normal NaOH used in Titration	Weight of the Benzidine Salt of the detergent	Detergent Found Weight	Detergent Found %
A	0.3918 gm.	0.367 cc	0.1582 gm.	0.1325 gm.	33.79%
B	0.3918 gm.	0.365 cc	0.1571 gm.	0.1315 gm.	33.53%
C	0.3918 gm.	0.374 cc	0.1599 gm.	0.1337 gm.	34.09%
Mean of the three determinations				0.1326 gm.	33.80%

The calculations were done by the formula:

$$\frac{\text{Wt. of Benzidine Salt of the Detergent} - 0.07 \times \text{cc. NaOH} \times \text{Normality}}{\text{Oven dry weight of the sample}} \times 100$$

The approximate "average molecular weight" of this detergent figured from the data of this analysis (the mean from Table IV and Table VI) was found to be 359.3

$$\text{Molecular weight} = \frac{\text{weight}}{\text{moles}}$$

$$\text{Molecular weight} = \frac{0.1326}{\frac{0.369}{1000}} = 359.3$$

It is hoped that this discussion of the theoretical principles of the method will prove helpful to the textile analyst not only in following the procedure given for specific compounds but also in enabling him to solve analytical problems in connection with other detergents and wetting-out agents.

Reference

(1) American Dyestuff Reporter, June 16, 1947, Quantitative Analysis of Igepon T, D. A. Shiraeff.

ABSTRACTS

Sorption of Nitrogen and Water Vapor on Textile Fibers

John W. Rowen and R. L. Blaine, Industrial and Engineering Chemistry, page 1659, Vol. 39, No. 12, October, 1947.

Using titanium dioxide and six purified textile fibers—wool, cotton, silk, acetate rayon, viscose rayon and nylon—sorption isotherms with regards to nitrogen and water were determined.

It was found that all fibers had relatively low capacity for the adsorption of nitrogen as compared with the relatively high capacity for adsorption of water vapor. The surface areas available to nitrogen molecules at —195° C. were found to vary from 0.31 square meters per gram for nylon to 0.96 square meters per gram for wool.

The free energy of adsorption of nitrogen on the six fibers was calculated and it is noted that these values for wool, silk, viscose and cotton fall on a common curve whereas those for nylon and cellulose acetate do not.

Resistance of Resin-Impregnated Cotton Fabrics to Microorganisms

W. Lawrence White and R. G. H. Siu, Industrial and Engineering Chemistry, page 1628, Vol. 39, No. 12, December, 1947.

A study was conducted to determine the degree of fungi and bacterial resistance obtainable by impregnating cotton cloths with urea-formaldehyde and melamine-formaldehyde resins to form a microbiologically resistant fiber coating.

Results based on pure culture tests with *Aspergillus flavites* and *Metarrhizium glutinosum* showed that complete resistance was attained with varying percentages of commercially available textile resins. 5.9% of one of the resins gave the best performance in a 14 day soil test, the specimen retaining all of its tensile strength, whereas an untreated cloth lost all of its tensile strength in less than 7 days.

It is noted that the data obtained in this study are not conclusive as to whether resistance obtained is due to the effect of a physical barrier on the fiber or to the presence of antiseptic compounds in the resins.

Textile Testing in Germany

Herbert F. Schiefer, Lyman Fourt and Richard T. Kropf, Textile Research Journal, page 689. Vol. XVII, No. 12, December, 1947.

This paper, which is Part I of a four part report on textile testing in Germany, is concerned with tensile testing. A complete discussion and description is given for various types of machines and apparatus for fiber, yarn and fabric testing, including tearing strength, shearing strength and bursting strength. Many schematic drawings and photographs are given as well as mathematical formulae, curves, and test results which enable the reproduction of this equipment. An extensive bibliography, abstracted in many instances, is included.

Detergency Studies

William P. Untermohlen, Jr. and E. Louise Wallace, Textile Research Journal, page 670, Vol. XVII, No. 12, December, 1947.

This paper is presented in three sections:

I. Soiling of Cloth and Determination of its Extent.

Using three soiling compositions and bleached, Sanforized, unsized and unmercerized 80 x 80 print cloth, soiled specimens were made under controlled conditions. The measurement of soiling was made by reflectance as well as chemical analysis. Using various concentrations of the soiling pigment it was found that the reflectivity values of soiled cloths are related linearly to the logarithm of the quantity of soil present. It is believed that by careful use of the methods described, reproducible results can be obtained.

II. Washing Cloth of Various Degrees of Initial Soiling.

Specimens soiled as described above were washed serially and their reflectance values determined. Samples soiled with iron oxide were analyzed for iron content. The experimental methods and procedures are described in detail. It is indicated that the distribution of the pigment in a soiled cloth influences the ease of cleaning. Evidence was found that there is a relatively irremovable portion of pigment soil.

III. Influence of the Soiling Mixture and of Storage Conditions on the Ease of Washing of Soiled Cloth.

A number of pigment dispersions were used for soiling cloth specimens which were then stored under various conditions. The specimens were washed after storage of from one day to twelve weeks. The degree of cleaning was determined by reflectivity measurements. It was found that soiling mixtures containing oils of the lowest degree of unsaturation produced the least change in ease of washing under a given storage condition. Dry storage conditions effected the least change in ease of washing, and it is noted that nitrogen offers no advantage over air as a storage medium. A discussion of the results is included and two general recommendations made as to storage conditions and type of soil to be used in this type of detergency study.

Mildew- and Rot-Resistance of Textiles

P. B. Marsh, Textile Research Journal, page 597, Vol. XVII, No. 11, November, 1947.

The deterioration of textiles by either biological or nonbiological agents is reviewed. Of the biological agents causing deterioration, emphasis has been placed on the fungi. Wool appears to be more susceptible to bacteria than to fungi although the effect of bacteria has not been thoroughly investigated. It is indicated that photo-chemical degradation of fibers

in sunlight is a common nonbiological type of deterioration.

The effects of deterioration are described and correlated with conditions and lengths of exposure. It is noted that the methods for determining fiber and fabric deterioration are not completely satisfactory and the need for improvement exists.

Suggested methods for preventing biological deterioration are outlined and laboratory mildew-resistance test methods discussed.

Some Notes on Black for Textile Printing

J. H. Downey, Textile Age, page 52, Vol. 12, No. 3, March, 1948.

As a general rule there is less difficulty in obtaining a deep black from the fast color ranges, such as the vats, azoics and stabilized azoics, than when printing some of the less fast types of dyestuff by special processes. In the latter case, one of the best types of print black for all-round purposes is steam black from logwood extract commonly known as *noir reduit*. The matter of density in the roller printing of discharge styles, where black outlines or effects are used, sometimes give rise to difficulty. Two instances are cited and their remedies noted. These are: (1) the production of black and white effects on dyed grounds on a very light mercerized cotton handkerchief cloth, and (2) production of black and white colored effects on dyed grounds on heavy spun rayon. As regards the sharpness of impression, the two main points to be considered are the use of the right type of thickener and avoidance of impingement where necessary. A number of suggestions, designed to improve the sharpness of impression, are given.

Where fastness is not a first requirement and a good dense black, free from printing faults only is required, the use of steam logwood black will give better results. Steam aniline black will give fastness as well as better working qualities, the question of impingement being the main point to be considered. Suggestions for the avoidance of printing faults with vat blacks are given.

Soiling of light colored print pastes is a danger which arises in copper roller printing by the act of the black print paste being carried over from the first printing roller to the following roller carrying a light colored print paste. In some instances soiling may be avoided by: placing the lightest colors of the pattern as far away as possible from the black printing roller; printing the light color prior to the dark outline roller; use of a type of black which is known by experience to be free from the fault of tarnishing; polishing the copper rollers so that a highly burnished surface is obtained, thus lessening the tendency to the formation of color films and tarnishing; the use of brush furnishers and lint doctors.

To avoid rubbing and marking-off, the amount of dyestuff in the print paste should be carefully determined; the weight of the pattern, type of fabric being printed, and nature of the other dyestuffs used are also important factors.

Keeping the Well Dressed Male Cool in Summer

DuPont Technical Bulletin, page 27, Vol. 4, No. 1, March, 1948.

Recent research has made available knowledge which makes it possible to select colors which will promote coolness. It has been demonstrated that fabrics identical to the eye in every respect, including color, will vary as much as fourteen degrees in temperature under prolonged exposure to sunlight if one is dyed with high infra-red absorbing and the other with low infra-red absorbing dyestuffs. Of the sunlight absorbed by materials, most is transformed into heat. It is possible to produce a desired shade and at the same time improve consumer comfort by selecting dyes according to their infra-red reflectance characteristics. Instruments which can measure the reflectance of dyed fabrics throughout the entire infra-red region are not yet available. However, facilities do permit measurements up to 1000 millimicrons which may be used as a guide in selecting dyes for the production of relatively warm or cool shades. Dye combinations may then be selected by temperature rise measurements. The reflectances of a great many single color dyeings have been measured at the monochromatic wave length of 1000 millimicrons and the results tabulated.

A New Process for Dyeing Carbonized Piece Goods with Acid Dyestuffs

DuPont Technical Bulletin, page 48, Vol. 4, No. 1, March, 1948.

The Sodium Formate Process makes it possible to dye regular acid dyestuffs on carbonized piece goods without pretreatment. In addition the process utilizes all of the carbonizing acid and at the same time eliminates the deleterious effect of strong mineral acid on the fabric and on the dye kettle. Sodium formate is used to convert sulfuric acid to sodium sulfate and formic acid. Carbonized goods containing 5% sulfuric acid can be treated with 7% sodium formate to yield approximately 5% formic acid and 7% sodium sulfate. The following suggested dyeing procedure is given:

Load carbonized goods into dye kettle.

Add cold water to regular level for starting dyebath and start the reel.

Add 1% DuPont MP-189-S (diluted). Heat to 80°F.

Add 8 to 10% sodium formate (dissolved).

Run 5 to 10 minutes while heating to 100°F.

Add dissolved dyestuffs.

Heat to boil in 45 minutes.

Boil 45 minutes.

Flammability Varies with Type Test and Fabric

Marjorie W. Sandholzer, Textile World, page 109, Vol. 98, No. 3, March, 1948.

A survey of accidents involving ignited clothing indicates that the number of fabrics on the market which can be considered unusually hazardous is small. Rayon and cotton fabrics carrying an extra long or fine nap apparently constitute the major part of the unusually combustible group. Light nets, diaphanous materials, and certain coated fabrics have also appeared as a primary factor in some accidents. Two procedures, one using the horizontal position and one using the inclined position, have been developed for practical test purposes which agree well in classifying rayon and cotton fabrics with extra long or fine nap as hazardous, and ordinary fabrics in flat weave, sheeting, cotton and rayon prints and the like, as not highly combustible. Among brushed rayons with a shorter nap, fleeced- and tufted-cotton materials, and fine light nets, the inclined test classifies as unusually combustible a somewhat greater number of fabrics than does the horizontal test. There is also discussion on proposed Federal legislation.

Fastness and Levelness in Wool Dyeing

R. W. Moncrieff, Canadian Textile Journal, page 45, Vol. LXV, No. 4, February 20, 1948.

Acid dyestuffs are of small molecular size, i.e., the ultimate particles of which they are composed, the molecules, are small. Chrome dyestuffs are generally more complex and have bigger molecules. In addition, when chromed, a still larger molecule results. Dyeing depends on the

entry of dyestuff molecules into the wool pores and in boiling water the size of the wool pores is greatly increased so that the dyestuffs find their way in more easily. The small molecules of the acid dyestuffs find their way into the wool pores very easily, but because they are small they are liable to leave the pores as well as enter them. Continuous migration from pore to pore results in a uniform distribution and level and uniform dyeing. During drying and cooling, the pores of the wool contract, trapping the dyestuff molecules within them. If the pores are swollen again the dyestuff molecules may escape again. The larger molecules of the chrome dyestuffs find it more difficult to enter the wool pores but once they find their way in are reluctant to leave. The dyeings are thus fast to washing.

Rayon Yarn Dyeing

Robert W. Joerger, Textile Industries, page 65, Vol. 112, No. 1, January, 1948.

This is the first article in a series pertaining to modern methods of dyeing rayon yarns. It covers the increase in the use of rayon, the types of rayon available, uses of rayon, care in handling rayon, rayon packages, and dyes available for use on rayon.

The Stripping of Dyed Textiles by the Use of Hydrosulfite Compounds

J. Starkie, The Journal of the Society of Dyers and Colourists, page 340, Vol. 63, No. 11, November, 1947.

This paper is concerned with the use of sodium hydrosulfite and the sulfoxylate-formaldehyde compounds for stripping and the various processes which have proven successful.

Since each stripping process is a problem in itself, the following factors should be considered prior to treatment:

a. The class of dye to be removed.

b. The quality of the material to be treated and the necessity for insuring that its strength and handle are not impaired.

c. The final shade to which the stripped material is to be dyed.

d. The question of cost.

Scouring before stripping is important and care should be taken to remove all dirt and traces of oil in order to prevent an uneven strip and a subsequent poor dyeing.

Stripping procedures and formulae are given in detail for use on wool, fine woolen materials and heavily dyed indigo cloth. The importance of avoiding excess acid when stripping with sulfoxylate-formaldehyde compounds is noted.

Although vat dyes are not destroyed by reducing agents, two methods are given for removing a certain amount of color from dyed cotton. Suggested procedures for use on azoic dyes are included.

Experiments on the stripping of nylon have not progressed beyond the laboratory stage but the results obtained indicate that good strips can be obtained using a general formula and procedure as given.

Testing as an Aid to Efficiency in Finishing

E. G. H. Carter, The Journal of the Society of Dyers and Colourists, page 337, Vol. 63, No. 11, November, 1947.

The testing of product performance is discussed with regards to its importance not only to the finisher and the mill chemist but also to those engaged in pure research work.

The difficulties which arise in establishing suitable test methods for conrolling such treatments as dyeing, waterproofing, mothproofing and shrinkproofing are pointed out. However, it is emphasized that even with imperfect laboratory tests of performance, efficient use of the current methods of test can be made if the difficulties of selecting a representative sample and the variables produced by the test methods are recognized.

The remainder of the paper presents experimental data indicating the variable results that may be expected from improper sampling as well as the variations introduced by the testing machine or procedure. More efficient sampling and use of samples is discussed as is the control of variations within a test procedure.

Peroxide Bleaching Modern Practice for Major Textiles; Use of Stabilizers; New Techniques Possible

V. W. Slater and K. W. Richmond, The Dyer and Textile Printer, page 658, Vol. XCVIII, No. 13, December 19, 1947.

Hydrogen peroxide, when supplied to the bleacher, is quite stable and if reasonable care is taken when storing, to prevent exposure to dust and dirt, there should be little loss in strength.

Hydrogen ion concentration is the major controlling factor in the liberation of oxygen for purposes of bleaching. Adjusting to higher pH values with caustic soda causes the release of more oxygen. However, pH adjustment with sodium silicate or sodium pyrophosphate causes a stabilizing effect to take place. Intelligent use of both stabilizers and activators allows complete control of the activity of hydrogen peroxide bleaching solutions.

The importance of some form of cleaning or scouring of the material prior to bleaching is noted.

Bleaching procedures using hydrogen peroxide are given in detail for wool and woolen goods, rabbit fur, colored and white cotton goods, linen, straw and rayons.

Consideration is given to the effect of metals in the bleaching bath and recent developments in bleaching techniques are briefly discussed.

Phosphorylated Cotton Cellulose as a Cation-Exchange Material

Julian F. Jurgens, J. David Reid and John D. Guthrie, Textile Research Journal, page 42, Vol. XVIII, No. 1, January, 1948.

Phosphorylated cotton cellulose was investigated as a cation-exchange material. Preliminary work was done on samples phosphorylated with phosphorus oxychloride and pyridine. However, it was found that better results were obtained when using phosphoric acid and urea.

Based on measurements of cation-exchange capacity it was found that phosphorylated cotton cellulose made by the phosphoric acid-urea method has a high cation-exchange capacity and in some cases the capacities were comparable to those obtained with commercial cation-exchange materials. Further tests indicate that phosphorylated cotton fabric is an effective cation-exchange material and shows good flow characteristics in the calcium-hydrogen cycle.

Wetting of Wool as a Function or the Duration of Fadeometer Exposure

Kermit S. LaFleur, Textile Research Journal, page 39, Vol. XVIII, No. 1, January, 1948.

An investigation was made to determine the correlation between the wettability of wool and exposure to carbon-arc fading lamps and to evaluate its significance as a quantitative approach to light damage.

The experimental procedure used is given and consists mainly of observing the wettability of test specimens exposed for varying periods of time to carbon-arc fading lamps. Experimental results are reported and discussed. It is concluded that the results confirm previous indications of the sulfur-containing groups of the wool fiber being the most modified by light exposure. Good correlation was obtained between the degree of modification and wettability.

TRADE NOTES • NEW PRODUCTS

• New Bedford Textile Institute Golden Jubilee

One of the highlights of the three day celebration of the Golden Jubilee of the New Bedford Textile Institute on May 13, 14 and 15 was the presentation of a gift of one thousand dollars to Dean George Walker, president of the Institute.

The gift from the Alumni was made to Dean Walker in appreciation of his untiring and devoted interest in the welfare of the Institute during his many years of service, first as a trustee and later as dean.

Dean Walker, in his acceptance speech said that five hundred dollars of his gift will be donated as a personal contribution to the fund to establish the Samuel Ross Memorial Library at the Institute. The library is to honor the late Samuel Ross, who was largely responsible in making possible the establishment of the New Bedford Textile Institute.

More than four hundred graduates from many sections of United States, Canada and Cuba returned for the celebration. The successful jubilee was featured by class reunions, fraternity open house, a golf tournament, a clambake and the Jubilee banquet.

Seated at the head table at the Jubilee banquet were Rudolph C. Dick, president of the Naumkeag Steam Cotton Company of Salem, general chairman of the Golden Jubilee program; John H. Grady of Calco Chemical Division of the American Cyanamid Company, serving as toastmaster; Russell T. Fisher, president of the National Association of Cotton Manufacturers; William Karl, president of Firestone Textiles, winner of the Cotton Manufacturers Medal at the Institute in 1919; Harold B. Sturtevant of the Rhode Island School of Design, alumni historian; Commissioner of Education John J. Desmond, Jr., ex-officio member of the board of trustese; Lieutenant George C. Olsson, representing Governor Bradford; Dean Walker, Mayór Harriman, Allan Barrows, treasurer of the Gosnold Mills Corporation; Wright Bolton, Jr., agent of the Soule Mills; James Bolton, agent of the Gosnold Mills Corporation, and John A. Shea of Neuss Hesslein and Co.

Included among others in the list of visitors were James Adams, general superintendent of the Dionne Spinning Company, and Prof. Albert H. Grimshaw, a former instructor at the Institute and now at North Carolina State College.

Mayor Harriman brought the greetings of the city, extending his felicitations to the Institute as one of which the city is justly proud. The Mayor paid tribute to Mr. Ross as the founder of the Institute, who, though born in another country, gave himself to his adopted country and by his example helped others to succeed in life.

Mr. Russell Fisher delivered the main address of the evening. His address was a history of textiles from the time cotton yarn was spun between 4,000 and 5,000 B.C. down to the present time when the industry is using not only cotton, but wool, silk and rayon and more recently a whole new family of fibers.

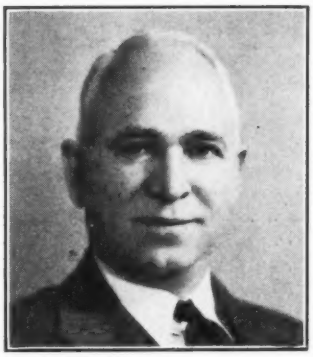
Dean Walker told of plans for the expansion of the Institute and adding a four-year course leading to a degree for those who completed it.

The annual shore dinner of the New Bedford Alumni Association was held at Dan's Pavilion on Saturday. Wright Bolton, Jr., agent of the Soule Mills and Nils Nelson served as toastmasters. The attendance was 360, more than double any previous gathering.

Among the special awards presented were those to Eduardo B. Ortiz of Havana, Cuba, coming longest distance, and Fred Taylor, engaged in research work for the U. S. Government, for being the oldest alumni member.

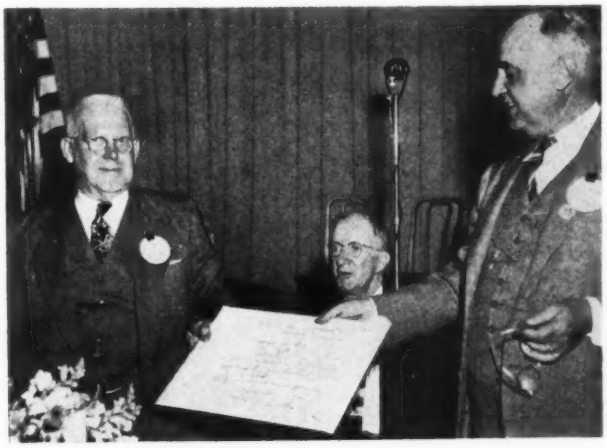
Mr. Taylor was graduated from the New Bedford School, Class of 1904, when he was winner of the medal presented by the National Association of Cotton Manufacturers. Rudolph C. Dick of Salem, re-

• President, AIC



Lawrence H. Flett who, as noted in a recent issue, was elected President of the American Institute of Chemists for a two-year term.

Mr. Flett is Director of the New Products Division of the National Aniline Division, Allied Chemical & Dye Corporation, with whom he has been associated for over 25 years. He was awarded the Schoellkopf medal in 1942 for his accomplishments in research. He has been active in the affairs of the Chemical Market Research Association, the Commercial Chemical Development Association, and the American Chemical Society. In the past year he was chairman of the New York Chapter of the American Institute of Chemists.



Dean George Walker receiving a gift of $1,000 from John H. Grady, President of the New Bedford Textile Institute Alumni Association, as Mayor Arthur Harriman looks on.

ceived an award for having the largest family in attendance.

Earlier in the day, the alumni re-elected John H. Grady president. Other officers elected were Harold B. Sturtevant, vice-president; Harold Horton, second vice-president; Edmund Dupre, secretary; Louis Fenaux, assistant secretary, and Francis Tripp, treasurer.

• Beckman Service Headquarters

In order to facilitate the servicing of the great number of Beckman Instruments in use throughout the Eastern and Middle Eastern areas, National Technical Laboratories, manufacturers of Beckman Instruments, has established its own factory servicing headquarters at 9 South Clinton Street, Chicago, Illinois. George R. Kinkaid, Mid-Western Representative for National Technical Laboratories is in charge.

The new Chicago Service and Repair Department is staffed with factory-trained specialists and features the latest equipment for servicing and repairing Beckman pH Meters, Spectrophotometers, Radiation Meters, Glass Electrodes and many other Beckman precision control instruments.

• UPDW Booklet

The United Piece Dye Works has just published a 16-page booklet entitled "United Finishes at Work", which describes and illustrates, photographically, the steps in dyeing, printing and finishing rayon fabrics.

Photographs of seven miniature working models of processing equipment, especially built by United, provide close-up views of important finishing operations.

Examples of United's special finishes are shown by means of fabric swatches. The booklet will be distributed to training directors, merchandise managers, piece goods and ready-to-wear buyers of retail stores, resident buyers, high school and college textile instructors.

At a later date, the model machinery illustrated in the book will be available for display by retail stores in conjunction with special promotions featuring over-the-counter fabrics and ready-to-wear in United's special finishes.

• LTI Alumni Reunion

The recent meeting of the Lowell Textile Institute Alumni Association, held at the Institute, featured the presentation of honorary awards to three outstanding friends of the school; Harold W. Leitch, Andover, Samuel A. Pinanski, Brookline, and Miss Helen G. Flack, Lowell.

Mr. Leitch was presented the honorary award of the alumni association for his untiring work for the Institute as chairman of the board of trustees for the past five years and as the leader in the formation of the New England Textile Foundation which provides scholarships and other aids to the New England textile schools. He is a graduate of L.T.I. and is now general superintendent in charge of research for the Pacific Mills.

Mr. Pinanski, also a recipient of the honorary award, was chosen for his excellent work in forming the Lowell Textile Institute Building Association which secured the necessary legislation to erect two new dormitories at the Institute, and for his spearheading the entire expansion program at L.T.I Besides being president of the Building Association he is vice-chairman of the board of trustees of the Institute. He attended both L.T.I. and Harvard and is president of M & P Theatres Corp.

Miss Flack, who serves as executive secretary to President Kenneth R. Fox of the Institute, was awarded an honorary alumni membership in recognition of her years of voluntary unpaid service to the alumni association in keeping its records and files. She is a graduate of Simmons College and past president of the Merrimack Valley Simmons Club.

The awards were made by J. Milton Washburn, president of the Association, and included a traveler's clock besides the engraved scroll representing the award.

Another feature of the program was the laying of the cornerstone of the second dormitory being built under the L.T.I. expansion plan. The ceremony was in charge of the newly elected student government and featured addresses by President Fox, Samuel Pinanski and Irwin C. Smoler, president of the student government who formally dedicated the building.

A. Chester Clifford, chairman of the Alumni Fund Council, reported on gifts to the Library Fund during the year. With intensified effort during the coming year it is hoped that the construction of the building, a gift of the alumni to the Institute, may start in the near future.

Five new members were elected to the board of directors of the association for 3 years. They included Louis Zisman, New York, Samuel A. Pinanski, Brookline, John T. Johnson, Pelham, N. H., William F. Brosnan, Newton, and Kenneth B. Park, Wellesley Hills.

Addresses by President Fox and Dean Simon Williams on the progress made by the school during the past year concluded the all day program.

• Sales Engineer, Rodney Hunt

M. Gilbert Hopkins, who has been appointed as a sales engineer for the Rodney Hunt Machine Co., of Orange, Mass., makers of textile wet finishing machinery.

Mr. Hopkins, associated with the firm since 1937, has both assisted in coordinating the design and development and been in charge of mill tests for new equipment. He served with the 42nd Infantry in World War II.

• New Monsanto Plant

Completion of a new plant at Trenton, Mich., for manufacture of Sterox AW and Detergent MXP, which are new nonionic controlled suds detergents, was announced by Monsanto Chemical Company.

The demand for these new type detergents, which were introduced in 1947, has been supplied since that time by an interim production unit at Monsanto's Anniston, Ala., plant. R. S. Weatherly, general manager of sales for the company's Phosphate Division, said that operation of the Trenton plant will enable Monsanto to meet an increasing demand for the products.

The new unit at Trenton will be in operation by June 1.

• Resin For Ion Exchange Processes

A new high-capacity synthetic resin cation exchanger is now offered in bead form by The Resinous Products & Chemical Co., Philadelphia 5, Pa. Its trade name is Amberlite IR-105, and the new resin is said to greatly widen the field of

usefulness for the family of Amberlite ion exchange resins.

Key advantages of the new resin are said to include: (1) a smooth spherical shape, (2) freedom from odor, taste and color-throw, (3) highly uniform particle size, (4) higher density, (5) rugged physical properties, and (6) high exchange capacity obtained at efficient regeneration levels. Its unusual chemical stability and high capacity are of special interest in applications such as the softening, dealkalization, and deionization of water.

The resin derives its activity from sulfonic acid groups, and may be employed either in the sodium or hydrogen cycle.

The resin is shipped in the sodium form (in a moist, completely swollen condition) but can easily be converted to the hydrogen derivative by treatment with mineral acids. The producers of Amberlite IR-105 suggest that "in salt-acid conversion, exchange chromatography, catalysis, and many other applications, the resin offers new possibilities in cation exchanger operation".

Literature and/or samples are available from The Resinous Products & Chemical Company, Washington Square, Philadelphia 5, Pa.

• Acquires Farnham Manufacturing

The Wiesner-Rapp Company, Inc., of Buffalo, New York, manufacturers of equipment for "wet-end" processing, announces the acquisition of the Farnham Manufacturing Company, 1600 Seneca Street, Buffalo, New York, who for over 40 years were leaders in designing and manufacturing special machinery. The combined equipment of these two companies will more than double the production facilities of Wiesner-Rapp and will permit them to keep pace with the constantly increasing demand for their finishing machinery.

Wiesner-Rapp will move to the Seneca Street plant about July 1st and all of their manufacturing operations will be carried on from there.

• Cyanamid Sales Representative

Appointment of Frank W. Dinsmore as a sales representative of the American Cyanamid Company, Textile Resin Department, has been announced by George C. Ramey, Manager of Sales Promotion and Advertising.

Mr. Dinsmore has joined the Textile Resin Sales Division in the New York City territory, and will be located at the local offices of the Company in the RCA Building.

• To Give Summer Course

Dr. Simon Williams, Dean of Lowell Textile Institute, who is giving a summer course on the textile industry at the University of Idaho, Moscow, Idaho. The course which started June 10th is designed to help link, through education, the widely separated producing and manufacturing areas of the nation's textile industry.

During the war Dinsmore was with the Army Air Forces for three years and saw service in India. Until recently, he was with the J. C. Penney Company.

• Joins Alexander Smith

A. G. Ashcroft, Director of Research and Development of the Alexander Smith & Sons Carpet Company, Yonkers, N. Y., announces the employment of Jesse de la Rama as a Quality Control Engineer in the Product Engineering Laboratories of the Research and Development Division of the Smith Company. Mr. de la Rama, who began his employment on May 3rd, will work under the direction of O. P. Beckwith, Chief of the Product Engineering Laboratories. A native of the Philippines, Mr. de la Rama served in the Army Air Corps as a Combat Pilot in World War II. Since leaving the Army he has been at North Carolina State College, obtaining his Master's Degree and teaching Textile Microscopy under Professor Paul Peach.

• Opportunities in Textiles

A new 32-page booklet, entitled "Your Career," published by the Textile Information Service and aimed to interest young men and women in seeking a career in the textile industry, is now being made available to mills for distribution to individuals and educational institutions throughout the textile manufacturing states.

Directed particularly to members of 1948 high school graduating classes, the booklet is a frank discussion of opportunities offered in the modern cotton textile manufacturing industry for young people with and without textile college training. Included are a considerable number of case histories of men and women who have been successful in the field, and a list of "do's and dont's" for beginners. Salary levels and promotion probabilities are discussed and housing and recreational facilities usual to mill towns and cities are reviewed.

Treating briefly on the sociological and technological progress made by the industry in recent years, the booklet makes no "pot-of-gold" promises but is optimistic about the future of the business. It concludes with the observation that modernization of plants, discovery of new products and profitable return after many lean years have developed opportunities far greater than ever before in the history of the industry.

• Canadian Textile Seminar

The Textile Technical Federation of Canada, (representing well over six hundred members of the Textile Society and The Canadian Association of Textile Colourists and Chemists) will sponsor The First All Canadian Textile Seminar at Queens University, Kingston, Ontario, on Friday and Saturday, Sept. 17 and 18, 1948. It feels that the time is opportune for such an undertaking and that it will have the support of management in enabling their technical men to attend this function.

The purpose of this Seminar is to provide a forum where papers covering:—

1. New ideas and new work may be disseminated and discussed.
2. Small groups may discuss the everyday problems of specific mill processes.

It is expected that such sessions covering every important technological aspect of the industry will enable everyone attending to be brought completely up to date on the latest techniques, and advance his own thinking along the specific lines in which he is particularly interested.

The Federation believes that a gathering of this kind with its exchange of information will strengthen the position of the industry in competing for the Canadian dollar.

Discussion groups will be at the technician level, and in general, will be related to everyday mill operations. Committees have been set up to handle the various sections of the industry.

Adequate facilities exist at Queens Uni-

versity so that a number of unrelated subjects will be under consideration at the same time.

A charge of ten dollars will be made for registration; accommodation and meals will be extra. There will be no organized recreation in connection with this meeting.

The authors of papers and discussion group leaders will be chosen only from those engaged in Canada, and every person engaged in the Canadian industry is invited to submit a paper or the outline of a paper to the chairman of the group concerned.

In July a full syllabus will be issued and questions invited for presentation at the discussion groups. At the conclusion of the Seminar a mimeographed copy of any or all of the papers will be available to all who register, but no discussion group will be reported.

• National Chemical Exposition

Plans for the fifth National Chemical Exposition to be held October 12 thru 16 at the Coliseum in Chicago include the revival of the National Industrial Chemical Conference, which was not scheduled at the last Show held in 1946.

"The Conference will feature noted speakers who will present interesting papers or new developments, discoveries and applications in industrial chemistry," said Dr. L. E. Clifcorn, chairman of the Exposition committee. "Sessions will be held in the Coliseum Annex under the same roof with the Show. All Show visitors will be welcome to attend the Conference."

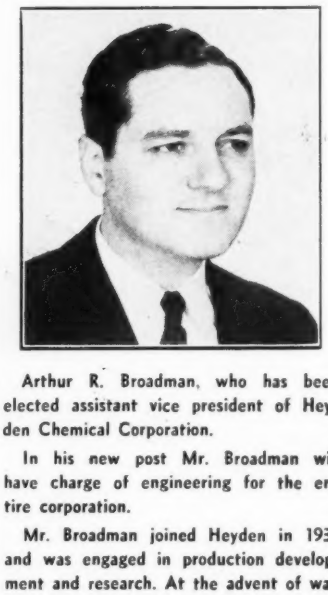
• o-Chlorobenzotrifluoride

o-Chlorobenzotrifluoride (o-chlorotrifluoromethylbenzene) has recently been introduced in pilot plant quantities by the Hooker Electrochemical Company. The compound is of interest for its potential applications as an intermediate in the preparation of various chemicals and dyestuffs, as well as for possible use as a special solvent and dielectric fluid.

o-Chlorobenzotrifluoride is a colorless, aromatic liquid which is characterized by the CF_3 group. This radical is generally stable to light, heat and chemical reaction. Its distillation range is 150.9° to 152.4° C.; freezing point is —7.4° C.; and its specific gravity at 15.5° C. is 1.379.

Technical Data Sheet No. 363 describes the product in more detail. Samples and literature may be obtained by writing on your business letterhead to the Hooker Electrochemical Company, Niagara Falls, New York.

• Vice President, Heyden



Arthur R. Broadman, who has been elected assistant vice president of Heyden Chemical Corporation.

In his new post Mr. Broadman will have charge of engineering for the entire corporation.

Mr. Broadman joined Heyden in 1939 and was engaged in production development and research. At the advent of war, he was active in pentaerythritol production for explosives at the Heyden Plant in Garfield, N. J.

Before joining Heyden, Mr. Broadman was engaged in production research for American Aniline Products, Inc., Hartford Rayon Corporation, Ansbacher-Siegle Corporation and Charles Helmuth, Inc.

He is a graduate of Phillips Exeter Academy, and of Yale University where he obtained a degree in chemical engineering.

• Director, Philadelphia Control

At the May meeting of the Philadelphia Control, Controllers Institute of America, held on May 6th at the Warwick Hotel, Franklin R. Ehmann of the Hellwig Dyeing Corp. was elected a director.

• Hercules Products Book

A new Hercules Powder Company products book, which classifies all of the company's chemicals by family groups, is now available. Approximately one hundred chemicals are described in the new book.

Included among the products listed for the first time are Abitol, hydroabietyl alcohol; Toxaphene, chlorinated camphene, agricultural insecticide poison; dried whey; Cellolyns, a series of resins specially designed for lacquers; Dresinols, a series of resin emulsions containing 40 to 45 per cent solids; and other new resins from rosin.

The family classifications into which products are divided are Cellulose, Synthetic Resins, Rosin, Terpene Solvents and Chemicals, Chlorinated Products, Dairy Products, and Explosives and Sporting Powders.

All of the products lists are briefly described as to chemical makeup, uses and potential applications.

• Butterworth Vacation Period

H. W. Butterworth & Sons Company, Philadelphia, Pa., announce a complete shut-down period to take care of summer vacations. The Factory and Office Building, located at York and Cedar Streets, will close operations the afternoon of July 2, 1948, and will remain closed until Monday morning, July 12. During this time, the Receiving Department will not be open to receive materials.

• Book on Berks County

The contribution of the textile industry to the growth of Berks County, Pennsylvania, is told in one chapter of a book just published to commemorate the 200th anniversary of the city of Reading.

The book, "Industrial Berks County," is written by Dr. Arthur D. Graeff, an authority on Pennsylvania Dutch folklore, and an instructor in history and social sciences at Overlook, Pa., High School. The illustrations, by Florence Starr Taylor, of Lancaster, Pa., are based on two years of historical research.

The book was published by three Reading firms, Textile Machine Works, Berkshire Knitting Mills, and Narrow Fabric Company. It was presented to the people of Reading and Berks County.

• Onyx-Mellon Institute Fellowship

Fourteen years ago the Onyx Oil & Chemical Company initiated the first of many research projects supported by this company in well known outside scientific institutions. The first project was opened at Mellon Institute in Pittsburgh, and it has been in operation continuously from then until the present time. During the years which have elapsed since this initial project, this policy of sponsoring research on important phases of the company's business in nationally recognized laboratories has been expanded to include investigations in many parts of the United States. The Textile Finishing Fellowship at Mellon Institute sponsored by the Onyx Oil & Chemical Company was begun on

February 12, 1934. Deliberately separated by distance and by the Institute fellowship system from the company's home laboratories and plant, work has been carried on by the fellowship which has resulted in new and improved products for the textile processing industries.

Early work included the development of methods for testing efficiency of water repellents. The study of sulfonation procedures by the Mellon Institute Fellowship has led to improvement of processes for the manufacture of several lines of anionic surface-active materials manufactured by this company. Cationic finishes giving permanent softness to cotton were developed from test tube experiments to full-scale production. A number of other types of surface-active materials have been developed by the Mellon Institute project which is currently studying materials which can be used to impart special finishing effects to textiles, and which, it is claimed, will withstand laundering and dry cleaning operations for the life of the fabric.

The Onyx Oil & Chemical Company is proud of this record of the past fourteen years, and confidently expects an equally productive period in the years to come in the development of new products for industry, and in the collection of significant scientific data pertaining to its production.

• Catalog of Scientific Instruments

A new catalog, published by the American Instrument Co., Inc. of Silver Spring, Maryland, describes numerous scientific instruments for use in chemical, biological, physical, metallurgical, engineering, and materials testing laboratories. The publication is generously illustrated and includes comprehensive data on general laboratory equipment.

It is available free of charge to laboratory workers.

• Joins ASA

George G. Sommaripa has joined the staff of the American Standards Association as head of the national standardization work on consumer goods. Mr. Sommaripa has had considerable experience in the textile industry as well as in general administration. He was vice-president and director of planning and research for the Silk Association of America from 1926 to 1933, served as assistant deputy administrator for the textile and leather industries for the National Recovery Administration in 1935, and carried out a study of the technological progress in the silk, rayon, cotton, and wool industries for the United States Department of Labor in 1936. Following several years experience as a consulting engineer and economist, he served with the Copper Division of the War Production Board from 1942 to 1946. Here, he helped organize the "Joint CMP Committee" for the steel and copper divisions on which he also served as vice-chairman. During the last year of the war Mr. Sommaripa was deputy assistant director for production for the Textile, Clothing and Leather Bureau of the War Production Board.

As a member of the staff of the American Standards Association, Mr. Sommaripa will work with the national trade, technical, and governmental organizations that are sponsoring the development of national standards for products used in the home. Committees are now working on standards for home electrical appliances, women's dress sizes, nylon hosiery, household refrigerators, farm and home freezers, and definitions of terms used in retailing.

• PTI Foundation Appeal

Charles W. Carvin of Pondel Fabrics, Inc., and President of Charles W. Carvin Company, Inc., New York, who will head the Foundation's Appeal for the Philadelphia Textile Institute Development Fund.

Mr. Carvin, long active in the textile industry and recently associated with Industrial Rayon Corporation as Vice-President in Charge of Sales, is an alumnus of Philadelphia Textile Institute, 1923.

The Philadelphia Textile Institute Foundation, a non-profit corporation founded in 1944 for the creation and development of facilities for textile education, has already made considerable strides toward its goal and expects to announce actual building plans in the near future.

• Wengraf Berichte

With regard to the item on page 277 of our April 19th issue, which states that the New York Public Library has prepared and catalogued a microfilm covering patent abstracts under the title "Wengraf Berichte, 1935-1938", we are now informed that the microfilm copy of the Berichte covers the period from January 1934 through August, 1939.

• Electronic Temperature Controller

A temperature controller, said to be simple, fast, and precise, has been developed by the Instrument Division of Thomas A. Edison, Incorporated, West Orange, New Jersey. The device uses a single electronic tube with an electrical resistance type bulb for thermal pick-up and is of the on-off type.

The use of the resistance bulb permits location of the sensing element at a point remote from the control panel and eliminates the necessity of thermal compensation. This device, which is non-indicating, may be used to control temperatures to close tolerances in solids, gases, or liquids. Units are available to cover the temperature range from —100° F. to 1200° F. and are adjustable within a range of several hundred degrees.

Supply voltage may be 115 or 230 volts 50-60 cycle alternating current. Load capacity is 30 amperes at 115 volts, 20 amperes at 230 volts. Accuracy of the controller is independent of usual voltage variation. Normal response time is under three seconds, due to the patented bulb construction.

A 5" x 5" x 10" control panel, weighing less than 8 lb., complete, is furnished and is provided with conduit knockouts and a rugged terminal board. This may be located at any convenient place and at considerable distance from the temperature zone.

• Book on Cellulose

Dr. Albert Schaeffer's translated German work, *Action of Alkali on Cellulose* (94 pp., 167 figs. $5) is accepted by American textile technologists as an outstanding treatise on the subject. Dr. Schaeffer is well-known in the United States as an authority on this subject, and the Office of the Quartermaster General obtained the document in the original and at once had it translated because of its considerable value.

Dr. Schaeffer, who prepared the report in the Textile Application Laboratory of I. G. Farbenindustrie, Hoechst, recognized the importance of fundamental studies with the aim of increasing the durability of cellulosic fibers such as cot-

ton and rayon, and his work constitutes a systematic investigation of alkalies and their effect upon cellulose. Data have been collected at different steps of the washing and laundering processes under various conditions to determine the action of the single components of the cleansing agents on cottons and rayons.

Chapter headings are: Investigation of the Effects of Common Laundering Agents; The Effect of Drying or Oxygen on the Alkali Boil; Chemical Reactions Possible During Treatment of Cellulose with Alkali in Presence of Oxygen; The Effect of Magnesium Silicate, and, Thermal Decomposition of Cellulose in the Course of the Drying Process.

Action of Alkali on Cellulose may be ordered from Hobart Publishing Company, Inc., Box 4127, Washington 15, D. C. Price is $5, postpaid.

• Report on Water Repellent

A water repellent which also provides shrink-resistance for rayon staple fiber is described in a report now on sale by the Office of Technical Services, Department of Commerce. The product developed since the war, was scheduled for production in 1947. It was discovered by OTS investigators at the I. G. Farbenindustrie Ludwigshafen plant in the course of a survey of synthetic detergent manufacture in Germany.

The product, referred to as "LU 3/158a," is the octadecyl ether of tetramethylol acetylene urea. Although complete information on its production was not obtained, a chemical diagram of its production is contained in the report. In its preparation acetaldehyde is oxidized to glyoxal and condensed with urea. The resulting ureide is converted to the tetramethylol compound which is esterified with octadecyl alcohol, the report states.

The product is applied by padding in an aqueous bath resulting in a five percent takeup in the rayon. It is then dried, baked, and washed. Tests showed the product to be more fast to laundering and to have better repellency than other German products, the report states.

The manufacturing steps are described in the 2-page report (PB-81830, *Water repellent for rayon staple fiber)* which sells for 25 cents a mimeographed copy.

The same product was mentioned but not described in detail in a report previously released by OTS (PB-3875), *Records of wartime improvements in fiber manufacture and in fiber processing,* mimeographed, 3 pages, 25 cents). The report, prepared for OTS by Julian F. Smith, U. S. Office of Naval Research, is a general description of textile auxiliary manufacture at the IGF Ludwigshafen plant.

A more comprehensive report on the production of textile auxiliaries at Ludwigshafen (PB-32565, *Textile auxiliary products,* mimeographed, 78 pages; $2) prepared by British investigators is also available from OTS. It contains data on synthetic textiles, detergents, water repellents, wetting agents, and surface active substances.

Orders for reports should be addressed to the Office of Technical Services, Department of Commerce, Washington 25, D. C., and should be accompanied by check or money order payable to the Treasurer of the United States.

• New Genesee Chemicals

Iso- and Tere-Phthalic acids and rare aldehydes such as capryl aldehyde are among the new organic chemicals recently developed by the Genesee Research Corporation of Rochester, N. Y. The addition of these makes a total of more than 40 rare organic chemicals which this company now has available in research and pilot plant quantities. Besides developing these new chemicals, the Genesee Research Corporation has facilities and personnel available to undertake the manufacture of organic chemicals to customers requirements. A list of chemicals which this company offers will be sent upon request to Genesee Research Corporation, 577 Lyell Ave., Rochester, N. Y.

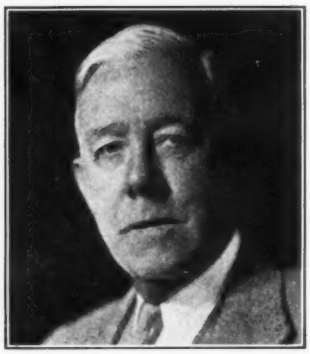
OBITUARY

RALPH E. DORLAND

RALPH E. DORLAND, President of the Synthetic Organic Chemical Manufacturers Association, died suddenly on May 14th. He was 69 years old.

Mr. Dorland was born in Elyria, Ohio, on August 22nd, 1879 and was a direct descendant of Gerretse Dorlandt who settled in 1668 on Staten Island, New York. He received his Ph. G. in 1901 from Purdue and was in the drug business from 1901 to 1914. He was a professor of chemistry and pharmacy at Greene's School of Pharmacy from 1915 to 1918. He joined Dow Chemical Company as manager of pharmaceutical sales in 1918 and has been Manager of their Eastern Office in New York from 1919 until his death.

Mr. Dorland was a member of the Illinois Pharmacists Association and was president in 1913 and 1914. He was president of the Chemical Salesmen's Association in 1923 and 1928 and a member of the executive committee from 1921 to 1931. He was a member of the Board of Governors of the Synthetic Organic Chemical Manufacturers Association since 1924,



Ralph E. Dorland

Vice-President from 1925 to 1930, Treasurer from 1930 to 1945, and President since 1946. He was also a member of the Board of Directors of the Drug and Chemical Section of the New York Board of Trade. He was a member of the New Jersey Chemical Society, a Mason, and belonged to the Chemists' Club, Rockefeller Center Lunch Club and the Drysalters Club.

* * * * *

The following is a portion of a tribute offered by August Merz, honorary member of the board of governors and past president of the Synthetic Organic Chemical Manufacturers Association at its meeting on May 25th at Shawnee-on-Delaware:

"It is a privilege and an honor to be permitted to offer a tribute to the memory of our departed president Ralph Erskine Dorland.

"His sudden passing on May 14, 1948 was a severe shock to his host of friends. But they should not selfishly emphasize the loss they suffer. Rather should they rejoice in having had the privilege of a close association with one possessed of such sterling qualities.

"To all of us he was our beloved President. To the members of the Board of Governors, he was ever a stalwart coworker. Beyond these he was a loyal friend and a congenial companion.

"He was broadminded, always expressing his opinions cogently, openly and frankly. He never showed any rancor when his suggestions failed of acceptance. His outstanding ability brought him high office and honor in recognition of his civic and industrial services.

"Ralph Dorland often said that he hoped never to retire from active business so long as he retained a spark of energy. He was fortunate. His wish was fulfilled for he was active to the last day of his life.

"A truly outstanding member of our industry, he leaves us a lasting legacy, the fine influence he always exerted."

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For Softness As You Like It

AHCOVELS* bring good draping qualities and a smooth, flexible hand to your cotton, wool and synthetic fabrics. These improved substantive softeners impart softness as you like it.

AHCOVELS are permanent; they permit laundering and dry cleaning.

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AHCOVELS E, F & R do not affect light fastness or color.

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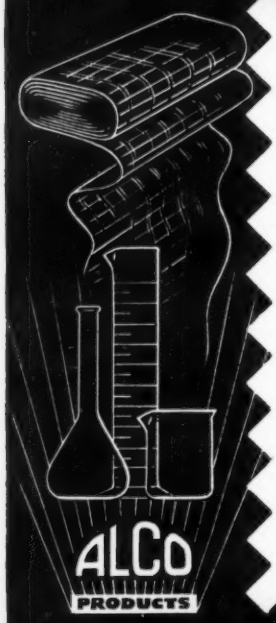

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for sizing and finishing

VULCANOLS have proven to be efficient for the production of durable, flexible finishes on tickings, shade cloths, book cloths, baggings, pile fabrics, hair cloths, label cloths and carpets.

for starch sizing mixes

VULCANOLS are economical plasticizers and binders providing finishes of increased resistance to mechanical removal.

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And to assure a
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For Your Yarns and Fabrics

Aquakal 74 is the rapid penetrant and leveling agent that tops the list—by Draves Test and on your machines. Also used for rewetting in producing •SANFORIZED• fabrics.

Hydroxy Hand Cream — **for the operators handling nylon to keep their hands smooth.**

Two Of A Full Line of Kali Textile Chemicals

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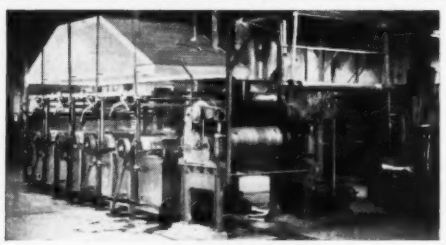
OF FINISHING EQUIPMENT



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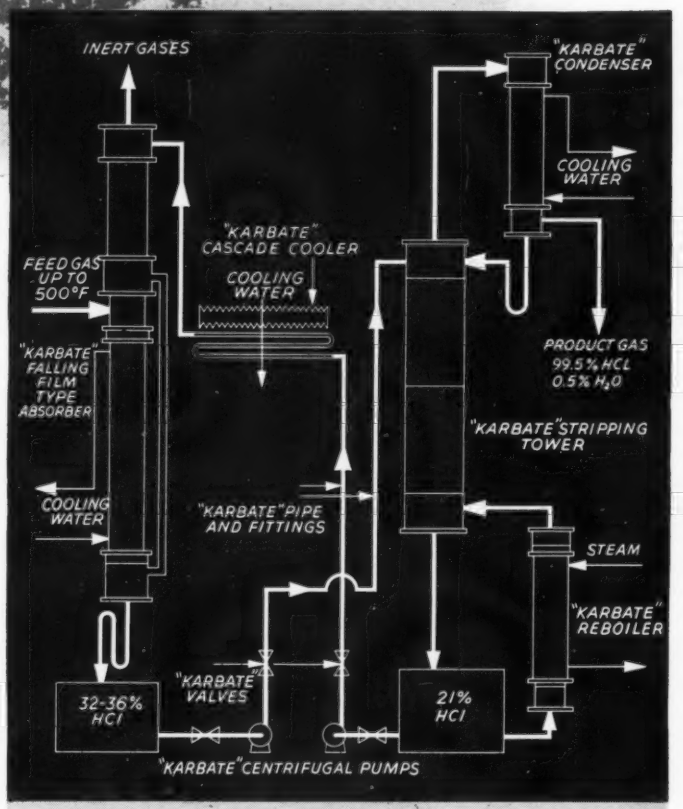
Let us make recommendations for your wet finishing requirements of all types.

RIGGS AND LOMBARD
INCORPORATED
FOOT OF SUFFOLK ST., LOWELL, MASS.

MAKE ANHYDROUS HCl?

Whip corrosion with "KARBATE" Impervious Graphite Equipment!



A typical flow sheet of one system for producing anhydrous HCl from feed gases up to 500 deg. F. containing inert gases.

IF YOU manufacture anhydrous HCl for use in the production of plastics, alkyl chlorides, synthetic rubber, or other materials, you can eliminate corrosion permanently by using "Karbate" Impervious Graphite corrosion-resistant equipment. The *entire* system can be assembled of *standard* "Karbate" units, including acid absorbers, cascade coolers, towers, heat exchangers, pipe, valves, condensers, pumps, tanks, and fittings. This equipment has the following advantages:

1. **Chemically inert to all concentrations of HCl**
2. **Very high heat-transfer rate**
3. **Light weight with adequate strength**
4. **Immune to thermal shock**
5. **Resistant to mechanical shock**
6. **Easy to machine and install**

For more details on the use of "Karbate" Impervious Graphite in producing anhydrous HCl, write to National Carbon Company, Inc., Dept. AD.

These products sold in Canada by Canadian National Carbon Company Ltd., Toronto 4, Canada

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Boil-Off Assistants	Protex #121	Sulfonated Condensation product
Degumming Agents	Detersol	Soap and buffer salts
Detergents	Turpenol	Soap and solvents
Coning Oil for Nylon	Stantex NSP # 125 and #127	Nylon coning oil
Coning Oil for Rayon	Stantex Coning Oil	Rayon coning oil
Delustrants	Duller W	Colloidalized pigment, light shades
	Dulstan	Colloidalized pigment, dark shades
Dye Fixing	Solidina	Alkyl aromatic addition compound
Dyeing Assistants and Penetrators	Pyrotex	Sulfonated condensation product
	Dyeing Oil	Sulfonated oils and solvents
Dye Retarding Agents	Retardine	Special mix for vat colors
Emulsifying Agents	Emulsifier Base	Specially treated sulfonated oils and fats
Finishing and Weighting Compounds	Voile Finish	Full, firm body finish
	Non-Slip Finish	Rayon and acetate satins
	Weighter Finish	Gums and weighters for acetates and rayons
	Standafin #109	Spun rayon
	Guminol	Weighter for rayons, acetates and spuns
	Gum Filler	Soft body, rayons, acetates and spuns
	Standafin #77; R-10	Permanent finish
Scrooping Agents	Scroop Oil	Special sulfonated and saponified oils
Size	Rayon Size	Blend of wax and gums
Staple Fiber Oils	Stantex #3005	Finishing oil for raw stock dyeing of staple fiber
	Stantex #3006	
Softeners	Standapol Oils	High sulfonated vegetable oils
	Stanteosine	Cation active softener
	Tallofin	Sulfonated tallow
	Rubinol	Sulfonated coconut oil
	Wax Cream	Blend of softening waxes
Splashproofing and Waterproofing Agents	Stantex Splashproof	Colloidal waxes and metal salt dispersion
	Stantex Waterproofing	Colloidal waxes and metal salt dispersion

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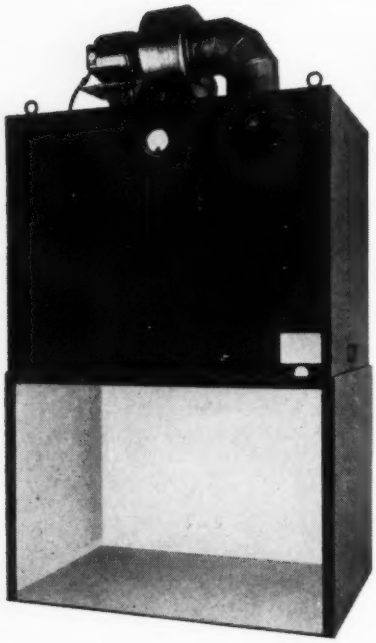

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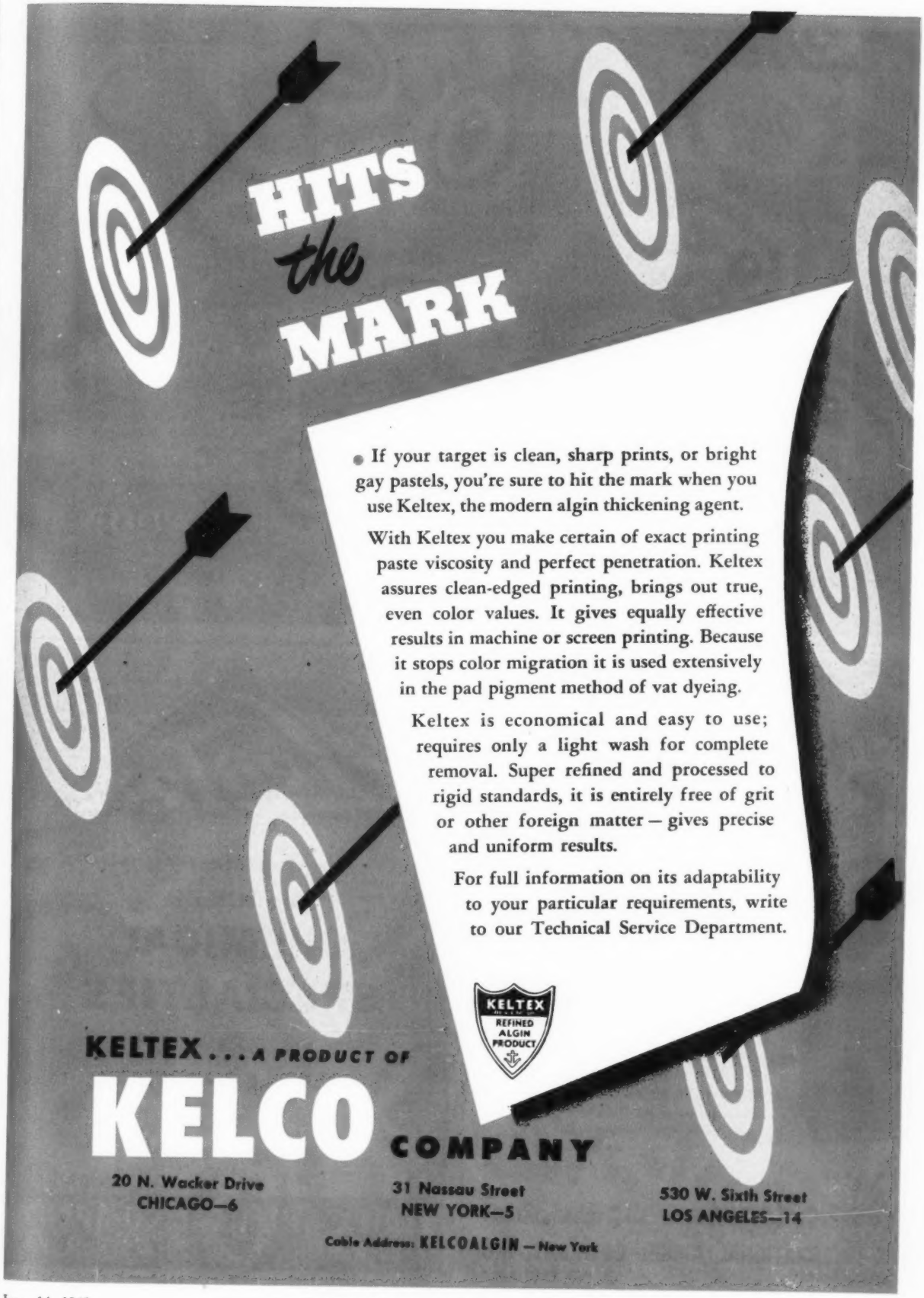
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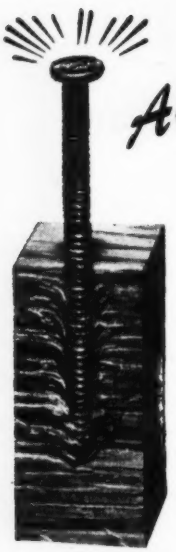

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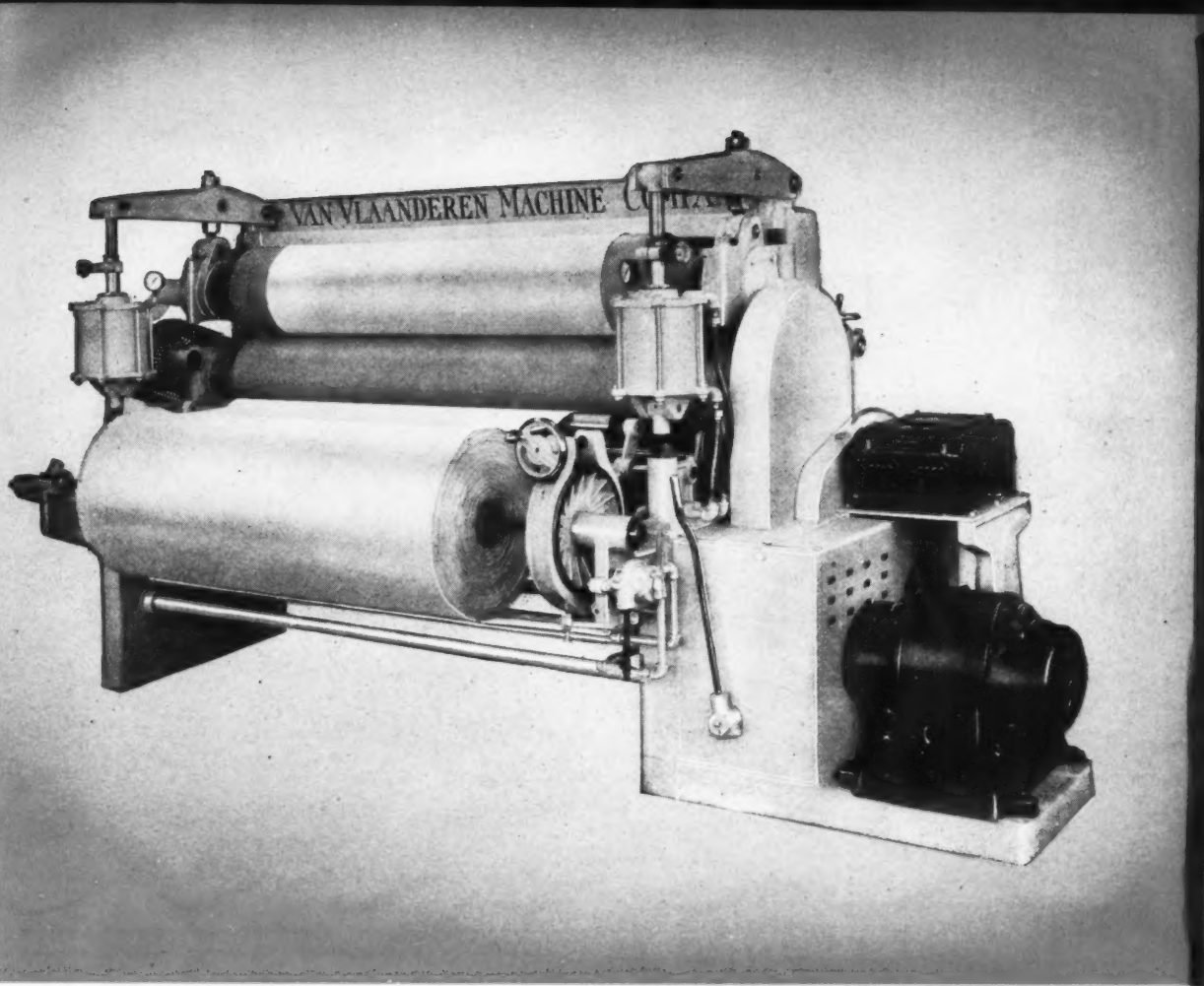

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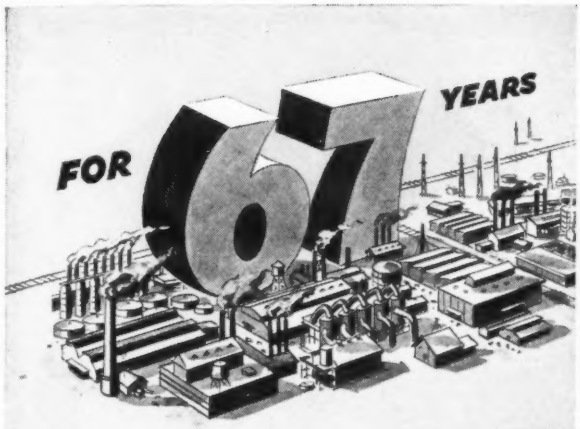

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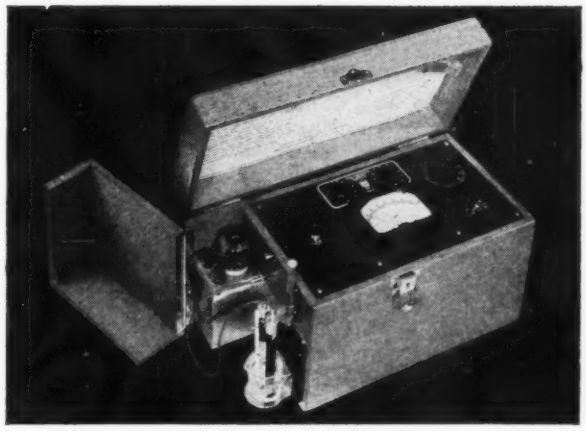

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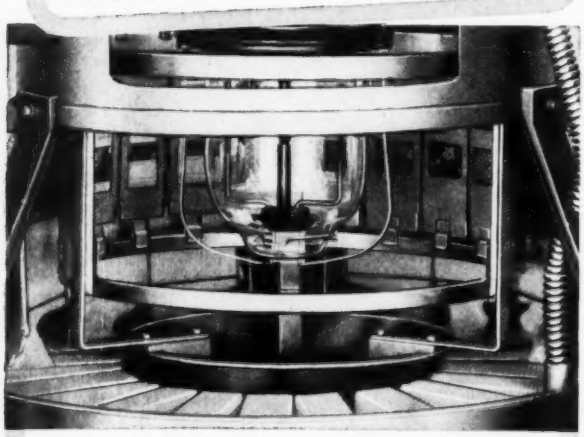
Available for installation on all Model FDA and FDA-R Fade-Ometers now in use. . . .



A lower ring engaging the new modified specimen holders supports the specimens during exposure in such a way as to assure more equal distribution of energy for all samples.

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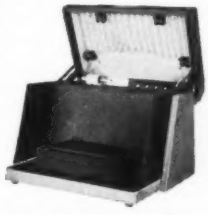

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Nyanza Color & Chemical Co. .....

Onyx Oil & Chemical Co. XXVII
Orleans Co., Inc. XLV

Pabst Sales Company .....
Perkins & Sons, Inc., B. F. IV
Peuchot Color & Chemical Co. XXXVI
Philadelphia Quartz Co. .....
Procter & Gamble XX

Refined Products Corp. V
Richmond Oil Soap & Chemical Co., Inc. ..... XXXIV, XL
Riggs & Lombard, Inc. XXXII
Rohm & Haas Company .....
Rona & Co., Inc., L. L. .....
Royce Chemical Co. .....
Rumford Chemical Works .....

Sandoz Chemical Works, Inc. .....
Scholler Bros., Inc. ..... Third Cover
Shepard Chemical Corp. XLII
Sindar Corp. XLII
Smith, Drum & Co. .....
Socony-Vacuum Oil Co., Inc. .....
Solvay Sales Div., Allied Chemical & Dye Corp. XLIII
Sonneborn Sons, Inc., L. .....
Standard Brands, Inc. XVII
Standard Chemical Products, Inc. XXXV
Stein Hall & Co., Inc. .....

Tennessee Eastman Corp. XXI
Titan Chemical Products, Inc. XXXIV
Truitt Mfg. Co. XLIV

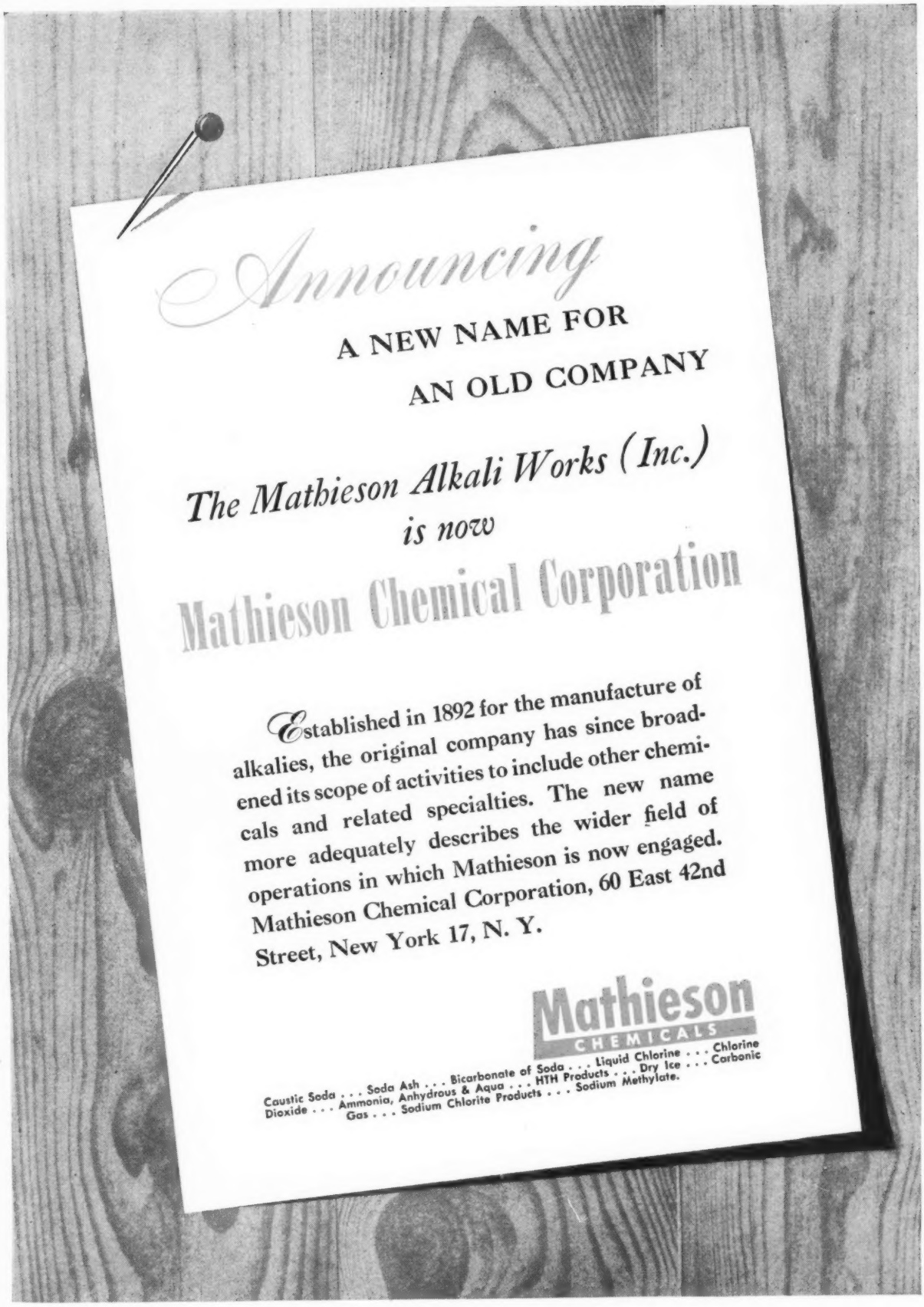
Union Carbide & Carbon Corp. XXXIII
United Chemical Prod. Corp. .....

Vanderbilt Co., Inc., R. T. .....
Van Vlaanderen Machine Co. XLI
Vellner, Eugene XLII
Virginia Smelting Co. .....

Wallerstein Co., Inc. .....
Warwick Chemical Co. ..... Second Cover
Watson-Park Company XVIII
Wolf & Co., Jacques XVI

Young Co., J. S. .....
Young Aniline Works .....

Zinsser & Co., Inc. XL
Zurn Co., O. F. .....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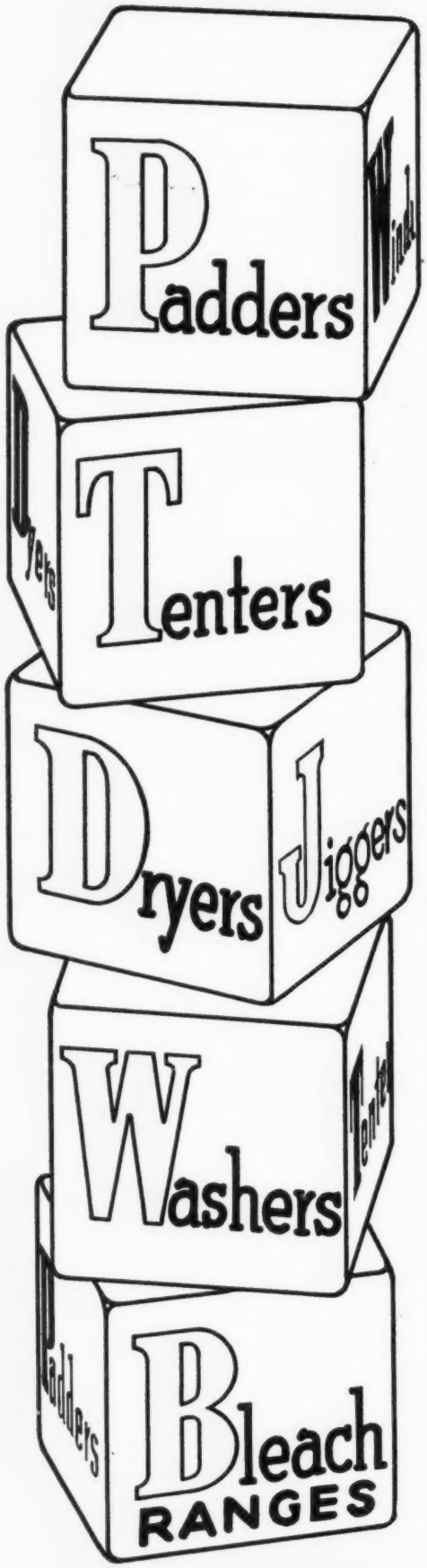

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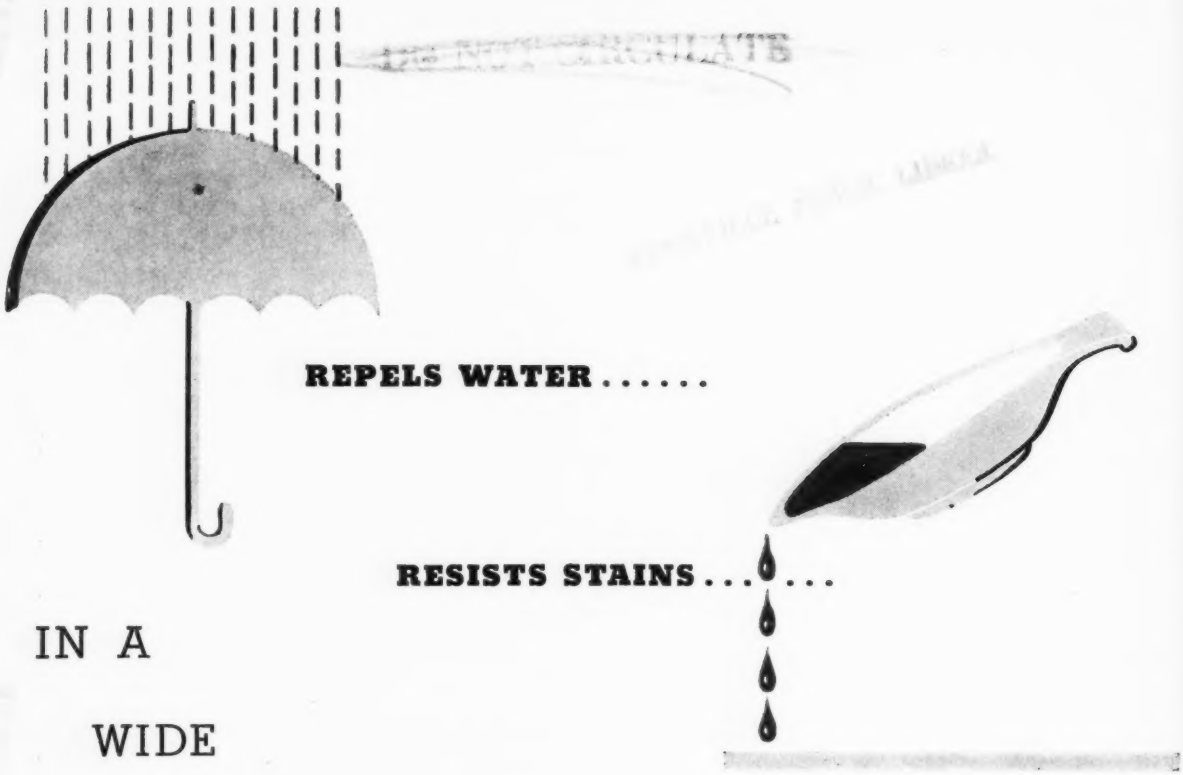

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